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OF THE
SAN DIEGO SOCIETY OF NATURAL HISTORY
VOLUME IV

Palaeozoic Crustacea

Part I—A Bibliography of Palaeozoic Crustacea.

Part II—A List of the Genera and Subgenera of the Trilobita.

Part III—A Summary of the Ordovician Genus Cybele Lovén.

BY
ANTHONY WAYNE VOGDES

SAN DIEGO, CALIFORNIA
PRINTED FOR THE SOCIETY
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INTRODUCTION

This series of papers is issued by the San Diego Society of Natural History, San Diego, California, to the Presidency of which, for a period of over fifteen years, its author, the late General Anthony Wayne Vogdes, was elected from year to year until he was allowed to retire at his own request. The principal part is the continuation of a series of bibliographies of Palaeozoic Crustacea which the General has been publishing since 1890. He was in the midst of the preparation of this work at the time of his death in his eightieth year. He died February 8, 1923, after an illness of only two days.

General Vogdes was born in West Point, New York, April 23, 1843. He volunteered as a drummer boy almost at the beginning of the Civil War, gained a second lieutenancy before he was twenty and finished a brevet major "For gallantry and meritorious services during the war." After the War he decided to follow the lead of his father, a general in the Regular Army, and of his great uncle, "Mad" Anthony Wayne of Revolutionary fame, and entered the Army with an officer's commission. He served with distinction and to the satisfaction of his superiors until he was retired a brigadier general on reaching the age limit. It is of record that he carried two books with him through the Civil War, a Bible which his mother had given him and a general work on Geology. It is not now known whether his taste for things geological came from the study of this book or whether the book was secured on account of a taste already acquired, but from that time to the day of his death he was an indefatigable worker along palaeontological lines. Doing his full duty in his chosen profession, he yet found time to make himself an authority on Palaeozoic Crustacea, particularly Trilobites, and to publish a long series of papers on this subject.

Besides this he managed to gather together a library of Geology and Palaeontology, especially of Palaeozoic Crustacea, of over 40,000 titles, as well as a very valuable general library. This includes many full sets of proceedings of scientific societies and many invaluable old editions of scientific works. He once stated at a meeting of the San Diego Society of Natural History that he believed he had everything which had ever been published on the geology of California. Nearly a year's work in this library has convinced the writer that he must have had almost everything which has ever been published on Palaeozoic Crustacea. Fortunately, this library has not been dispersed, but through the generosity of his niece and residuary legatee, Mrs. Stewart Kendall, has been donated to the scientists and public of San Diego for perpetual use. It is deposited in the San Diego Scientific Library, Balboa Park, San Diego.

The library is accompanied by an author and subject catalog of about 40,000 cards, all prepared by the General. He also left an exhaustive

catalog of Palaeozoic Crustacea with very full references to all the literature on this subject, an estimate of which runs to about 60,000 cards. Besides the bibliographical references, a large portion of the cards carry photographs, mostly from published plates, showing a considerable share of the Crustacea of which they treat. A smaller proportion carry camera lucida drawings from actual specimens or from published plates. In order to do this work the General made himself proficient in photography, just as he made himself an artist in bookbinding in order to give the best of care to the books and pamphlets which he loved with all the ardor of a true bibliophile. He finished binding a set of books two days before his death.

The suddenness and unexpectedness of his death accounts for the fact that the manuscript of the papers here printed was in an unfinished state, needing a very large amount of rearranging, a small amount of cutting down and some correction. No one seemed available who could spare the time without compensation, for which there was no provision, and who possessed the necessary knowledge of the subject to do this work as it should have been done. Therefore, at the solicitation of his associates in the Directorate of the San Diego Society of Natural History, the writer consented to undertake the work, although he had no direct knowledge of the subject except such as he has been able to acquire by studying the manuscript and the remarkable library left by General Vogdes. He wishes to acknowledge much splendid advice and some direct help received from Dr. Charles E. Resser of the National Museum in Washington, but desires to accept full responsibility for such errors as must necessarily be evident to specialists who are familiar with the subjects of which the publication treats.

Fred Baker.

Point Loma, California,
July 25, 1924.

PART I.

A BIBLIOGRAPHY OF PALAEOZOIC CRUSTACEA, SUPPLEMENTING THE AUTHOR'S PREVIOUS PAPERS ON THE SAME SUBJECT*

(Arranged Alphabetically by Authors)

AGNUS, ———. *Palaeoblattina douvillei*, considerée d'abord comme un Insect, est une Pointe génale de Trilobite.—Comptes-rendus, Acad. Sci., Paris, Vol. 138, 1904, pp. 398-399.

ASSELBERGS, E. Description d'une Fauna Frasnieni Inférieure du Bord Nord du Bassin de Namur.—Bull. Soc. Belge Géol. Brux., Vol. 26, 1912, Mémoires, pp. 1-47, plates 1-6.

Bronteus flabellifer Goldf.

Cryphaeus punctatus Stein.

Dechenella verticalis.

——— Description des Fossiles découverts par M. J. Duvigneaud aux Environs de Neufchateau.—Bull. Soc. Belge Géol. Brux., Vol. 26, 1913, Mémoires, pp. 189-215, figs., pl. 8.

Homalonotus sp.

Cryphaeus drevermanni Richter.

This is the *Cryphaeus laciniatus* Drevermann, Palaeontogr., pl. 49, p. 74, 1902, which Richter referred to a new species. The generic name *Cryphaeus* Green, 1837, was pre-occupied in Coleoptera in 1833 and Corda's generic name *Asteropyge* should take its place.

——— Le Dévonien Inférieur du Bassin de l'Eifel et de l'Anticlinal de Givonne dans la région Sud-Est de l'Ardenne, Belge.—Mémoires Inst. Géol. Univ. Catholique de Louvain, Tom. 1, Mém. 1, 1913.

Arthropoda, p. 121.

Homalonotus planus Sandb., Sud du Bassin de Dinant; *H. ornatus* Koch, Sud de Martelange; *H.* cf. *multicostatus* Koch, Ardoisies de Warmifontaine.

Phacops ferdinandi Kayser, characteristique des Hundsrückschiefer sur le Rhin.

Dalmania (*Odontochile*) cf. *spinifera* Barr., Hundsrückien inférieure de Martelange.

Cryphaeus drevermanni Richter; *C. sp.*

Proetus sp.

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*1. "A Bibliography of Palaeozoic Crustacea from 1698 to 1889, including a list of North American species and a systematic arrangement of genera." U. S. Geological Survey Bulletin No. 63, Washington, D. C., 1890.

2. "A Classed and Annotated Bibliography of the Palaeozoic Crustacea from 1698 to 1892, to which is added a catalogue of North American species." Occasional Papers IV, California Academy of Sciences, San Francisco, Calif., June, 1893.

3. "Supplement of Bibliography of Palaeozoic Crustacea." Proceedings, California Academy of Sciences, Vol. V, pp. 53-76, San Francisco, Calif., 1895.

4. "Palaeozoic Crustacea. The publications and notes on the genera and species during the past twenty years, 1895-1917." Transactions, San Diego Society of Natural History, Vol. III, No. 1, San Diego, Calif., 1917.

Barbour, Erwin H. Eurypterid Beds of Nebraska with Notice of a New Species, *Eurypterus nebraskensis*.—Geol. Sur. of Nebraska, Vol. 4, Part 12, 1914, p. 201, figs. 3 and 4.

Eurypterus sp., p. 202, fig. 5.

The Eurypterids of Nebraska are small, the average being a little over 40 mm. in length.

Preabdomen slightly inflated and blending gradually into the postabdomen, giving a vermiform appearance; telson long and slender; scale markings distinct and very regular in pattern over the tergites.

The new species may be placed in the *Eurypterus stylus* Hall group.

Barrois, C. See Gosselet, J. A. A.

Bassler, R. S. Crustacea.—Geol. Sur. of Maryland, Cambrian and Ordovician, 1919, pp. 332-373, pl. 24, 26, 27, 32, 33, 47, 48, 51, 52, 55 and 58.

The following species described and illustrated:

Eoharpes ottawaensis Billings

Cryptolithus bellulus (Ulrich); *C. recurvus* Ulrich, sp. nov.; *C. tesselatus* Green.

Ampyx (*Lonchodomus*) *normalis* (Billings); *A.* (*Lonchodomus*) *halli* (Billings).

Dolichometopus sp.

Hystricurus conicus (Billings).

Goniurus caudatus (Billings).

Triarthrus fischeri Billings; *T. becki* Green.

Isotelus stegops Green.

Revived Dr. Green's old name for a species in the Eden shales, compared with *Isotelus maximus*, which it closely resembles. The species has the eye further forward, smaller spines, and the flattened border, especially of the pygidium, less distinct.

Isotelus megistos Locke.

Bassler remarks that under the name of *Isotelus megistos* and also *Isotelus maximus* and *I. gigas* a number of distinct species, ranging through the Mohawkian and Cincinnatian, have undoubtedly been confused, with the result that these names have little stratigraphic significance.

Formerly the separation of the species was based upon the presence or absence of the genal spine, but it is now known that each species contains spinous and aspinous forms, the difference between the two being presumably that of sex.

The aspinous (?female) forms of these several species are quite difficult to distinguish from each other, but the spinous examples show good characters of differentiation. Thus in the case of *I. maximus* and *I. megistos*, long considered synonymous, the free cheeks of each are different. In *I. megistos* the base of the spine is much wider and it tapers much more rapidly.

The hypostoma furnishes further differences, for in *I. megistos* it shows coarser venations, the inner edges of the limb are straighter, and the whole hypostoma is relatively longer.

Isotelus gigas DeKay; *Isotelus sp.*

Asaphellus gyracanthus Raymond.

Hemigyraspis collicana Raymond.

Symphysurus convexus (Cleland).

Onchometopus simplex Raymond and Narraway.

Illaenus americanus Billings.

Bumastus trentonensis Emmons.

Saukia stosei Walcott.

Proetus latimarginatus Weller.
Cyphaspis matutina Ruedemann.
Amphilichas trentonensis (Conrad).
Acidaspis ulrichi sp. nov.
Calymene granulosa (Foerste); *C. senaria* Conrad.
Ceraurus pleurexanthemus Green.
Pliomerops salteri (Billings).
Pterygometopus callicephalus (Hall).
Order Notostraca: *Ribeiria* (?) *nuculitiformis* Cleland.
Suborder Ostracoda: *Isochilina gregaria* (Whitfield); *I. seelyi* (Whitfield).
Leperditia fabulites (Conrad).
Leperditella tumida (Ulrich).
Aparchites minutissimus (Hall).
Drepanella macra Ulrich.
Macronotella ulrichi Ruedemann.
Ceratopsis chambersi (Miller).
Ulrichia bivertex (Ulrich).
Bythocypris cylindrica (Hall).
Suborder Cirripedia: *Lepidocoleus jamesi* (Hall & Whitfield).
Suborder Malacostraca: *Caryocaris silicula* sp. nov.

BEUHAUSEN, L. VON. Ueber Hypostome von Homalonoten.—Jahrbuch der Königl. Preuss Geol. Landesanstalt für 1891, pp. 154-166, 6 figures in text.

The author holds that the hypostomae of the subgenera of *Homalonotus* do not show differences of taxonomic value. He illustrates the forked hypostoma of *Homalonotus bohemicus* Barr., which resembles very much that of *Calymene*. The other illustrations of hypostomae are those of *H. knighti, H. delphinocephalus, H. dekayi, H. armatus* and *H. rhenanus.*

The species represented are placed by Reed under subgenera as follows: *Homalontus* (*Echomalonotus*) *bohemicus, H.* (*Dipleura*) *dekayi, H.* (*Trimerus*) *delphinocephalus, H.* (*Koenigia*) *knighti,* and *H.* (*Digonus*) *rhenanus.*

BEYER, S. Beiträge zur Kenntniss der Fauna des Kalkes von Haina bei Waldgirnes (Wetzlar).—Verhandl. Nat. für Rheinl. & Westfalen, Vol. 53, Jahrg., 1896, pp. 56-102, 3 plates.

Trilobita: *Proetus subplanatus* Maurer, p. 59, pl. 1, figs. 1-5; *P. quadratus* Maurer, p. 58, pl. 1, figs. 7-11; *P. suborbitatus* Hzl., p. 63, pl. 1, fig. 12; *P. crassimargo* Röm., p. 63, pl. 1, fig. 14.

Tropidocoryphe novaki sp. nov., p. 65, pl. 1, figs. 16-22.

Cyphaspis hainensis sp. nov., var. nov., p. 66, pl. 1, figs. 23-25.

Acidaspiss radiata Goldf., p. 66, pl. 1, fig. 28.

Lichas granulosus (?) Roem., p. 67, pl. 1, fig. 27.

Bronteus granulatus (?) Goldf., p. 67, pl. 2, fig. 29.

Cheirurus sternbergi (?) Roem., p. 68, pl. 2, fig. 30.

BJORLYKKE, K. O. Norges Geologiske Undersøgelse Geologisk Kart. Losna. Christiania, Bd. 31, 1885.

BORN, AXEL. Synonymenliste vergl. *Calymene arago* Rouault.—Abhandl. der Senckenberg. Naturf. Ges., Bd. 36, 1916, p. 351.

————Zur organisation der Trilobiten: 1. Das Kopfschild von *Chasmops odini* Eichwald.—Senckenbergischen Naturf. Ges., Bd. 1, 1918, pp. 159-171.

Includes 8 text figures of the glabella and hypostoma, compared with those of *Nileus armadillo.*

BORN, AXEL.—Continued.

———— Eine Untersilurfauna aus den Montagnes noires, (Centralplateau).—Abhandl. der Senckenbergiana, Bd. 3, Heft 6, 1921, pp. 181-193.

Ogygia glabrata Salter.

Trinucleus primitivus sp. nov., p. 191, fig. in text.

Charakteristisch für die Art ist: (1) das Fehlen aller Augen- und Glabellartuberkeln; (2) die auffalend starke präfrontale Verschmälerung resp. seitlich rückwärtige, Verbreiterung des Limbus; (3) die regellose Anordnung der Grübchen an den Limbus; (4) die sehr schmale Glabella, Merkmal 2 und 3 habe ich bei keiner bisher bekannten Art der Gattung feststehen konnen.

Calymene (*Synhomalonotus*) *arago* Rouault.

———— *Calymene tristani* Stufe, (Mittleres Untersilur) bei Almaden, ihre Fauna, Gliederung und Verbreitung.—Abhandl. der Senckenberg. Naturf. Ges., Bd. 36, Heft 3, 1916.

Crustacea:

Beyrichia bussacensis hispanica var. nov., p. 347, pl. 26, fig. 3.

Primitia simplex Jones, p. 347.

Trilobita:

Placoparia tourneminei Rouault, p. 347, pl. 27, fig. 7, a, b.

Calymene tristani Brong., p. 348, pl. 26, figs. 4, a-e; *C. arago* Rouault, p. 351; *C.* (*Pharostoma*) *pulchra* Barr., p. 351.

Homalonotus brongniarti Desl., p. 351.

Cheirurus claviger marianus Vern. & Barr., emend. A. Born, p. 351, pl. 23, fig. 4.

Dalmanites socialis proaeva Emm., p. 352; *D. phillipsi* Barr., p. 352; *D. macrophthalmus* Brong., p. 352, pl. 26, figs. 5, a-c.

Asaphus contractus Vern. & Barr., p. 353; *A. nobilis* Barr., p. 353; *A. nobilis caudiculatus* var. nov., p. 354, pl. 27, figs. 2, a-c; *Asaphus sp.*, p. 354.

Ogygia glabrata Salter, p. 354.

Illaenus giganteus Burmeister, p. 355, pl. 27, figs. 3, a, b.

Illaenus beaumonti Rouault, p. 356, pl. 27, figs. 4, a-c; *I. puer* Barr., p. 356.

Lichas sp., p. 357, pl. 27, fig. 6.

BORNEMANN, J. G. Palaeontologisches aus dem Cambrischen Gebiete vom Canalgrande in Sardinien.—Zeitschr. der Deutschen Geol., Jahrgang 1883, pp. 270-274.

Notes on *Olenellus zoppii, Conocoryphe* and *Illaenus meneghinii.*

BROWN, H. Y. L. Report on Arltunga Gold Field and Hart's Range Mica Field and Explorations North-east of Hart's Range, North-west of Alice Springs and of the Frew River Country, &c. Appendix by R. Etheridge, Jr.—Contributions to the Palaeontology of South Australia, pp. 1-16, 2 plates and 3 geological sketch route maps, Folio, 1897.

Olenellus sp. nov.

The author illustrates a cephalon which bears no relation to any other Australian trilobite and departs from the structure of a large number of American species, such as *Olenellus thompsoni* and *Mesonacis gilberti,* in the continuation of the ocular lobes to the lateral cephalic borders. In this it agrees with some Swedish forms, such as *Holmia kjerulfi,* and also resembles the genus *Protolenus,* but not in any other character.

BROWNOCKER, J. A., See STAUFFER, CLINTON R.

BURHENNE, H. Beiträge zur Kenntniss der Fauna der Tentaculitenschiefer im Lahngebiet mit besonderer Berücksichtigung der Schiefer von Leun unweit Braunfels.—Abhandl. der Königlich Preuss. Geol. Landesanstalt, N. F., Heft 29, 1899.

Trilobita:

Proetus granulosus Goldf., p. 11, pl. 1, figs. 3-6; *P. cuvieri* Stein, p. 13, figs. 1, 2; *P. holzapfeli* Novak, p. 14, pl. 1, figs. 9-10; *P. lovéni* Barr., p. 15, pl. 1, figs. 7, 8.

Cyphaspis hydrocephala Roemer, p. 16, pl. 1, figs. 11-14; *C. convexa* Corda (?), p. 18, pl. 2, fig. 1.

Acidaspis pigra Barr., p. 18, pl. 2, figs. 7-9.

Bronteus dormitzeri Barr., p. 19, pl. 2, figs. 4, 5; *B. scaber* Goldf., p. 19, pl. 2, fig. 6.

Phacops fecundus Barr., p. 20; *P. fecundus major* Barr., p. 20, pl. 2, figs. 11-13; p. 3, fig. 1; *P. fecundus degener* Barr., p. 21, pl. 3, figs. 2-4; *P. breviceps* Barr., p. 22, pl. 3, figs. 6-7; *P. holzapfeli* sp. nov., p. 22, pl. 3, fig. 5.

Cyphaspis sp., p. 23, pl. 2, fig. 3.

Cryphaeus or *Dalmanites*, p. 23, pl. 2, fig. 2.

Trimerocephalus micromma Roem., p. 23, pl. 3, figs. 8-10. Referred *T. fugitivus* Barr., 1872, pl. 9, fig. 2, also Kayser's figures of Barrande's species, 1878, to *T. micromma.*

Arethusina inexpectata Barr., p. 25, pl. 3, figs. 11-12.

CALMAN, W. T. Crustacea in "A Treatise on Zoology," edited by Sir Ray Lankester, London, 1909.

Calman remarks, page 101, of the Copepoda:

On the hypothesis that the nauplius represents the ancestral type of the Crustacea, the Eucopepoda would be regarded as the most primitive existing members of the class, retaining as they do naupliar characters in the form of the first three pairs of appendages, and the absence of paired eyes and of a shell fold.

As already indicated, however, it is much more probable that they are to be regarded as a specialized and, in some respects, degenerate group, which, while retaining in some cases a very primitive structure of the cephalic appendages, has diverged from the ancestral stock in the reduction of the number of somites, the loss of the paired eyes and the shell fold, and in the simplified form of the trunk limb.

CARPENTER, G. H. On the Relationship between the Classes of Arthropoda. Proc. Roy. Irish Acad., Vol. 24, 1903, pp. 220-360, pl. 6.

The author has tabulated the number of trunk segments of Trilobites, and finds a steady increase throughout the Palaeozoic. His table was based upon very few genera, as follows:

Cambrian, 12 genera. Average number of body segments,.....17.66
Ordovician, 23 genera. Average number of body segments.....18.58
Silurian, 16 genera. Average number of body segments.....19.34
Devonian, 10 genera. Average number of body segments.....20.70
Carboniferous, 2 genera. Average number of body segments.....20.75

CARPENTIER, ABBE ALFRED. Contribution à l'étude du Carbonifère du Nord de la France.—Mém. Soc. Géol. du Nord, Tome 7 (11), 1913, p. 345.

CHAPMAN, FREDERICK. Preliminary Notes on a Collection of Trilobite Remains from the Dolobrock River, North Gippsland.—Proc. Roy. Soc. Victoria, New Ser., Vol. 21, 1908, pp. 268-269, pl. 11.

A brief notice of Upper Ordovician Trilobites at Dolobrock River, Mt. Wellington District, consisting of the genera *Agnostus, Proetus?,* and a doubtful type, perhaps referable to *Cheirurus.*

———— New or Little-known Victorian Fossils in the National Museum, XII.

———— On a Trilobite of the Upper Cambrian Age, (*Olenus* series) in N. E. Gippsland, Victoria.—Proc. Roy. Soc. Victoria, New Ser., Vol. 23, 1911, pp. 305-324.

Agnostus australiensis sp. nov., p. 314, pl. 58, figs. 9-12.

The form is closely related to *Agnostus pisiformis,* especially in the form of the cephalon, but in the width of the pygidium it is most like the var. *obesus.*

Ptychoparia thielei sp. nov., p. 316, pl. 58, figs. 2, 3, 5, 7 and 10.

Cephalon large, broad in front; glabella large and tumid, elongate, and tapering somewhat towards the front, more than two-thirds the entire length of the cephalon; surface finely tuberculate; glabellar furrows 4 pairs; palpebral lobe sublunate; eye lobes very narrow; facial sutures strongly curved at the eye margin, turning sharply outward, and then gently inward, to the anterior margin of the head, which it meets a little nearer to the central line than the eye; from the posterior end of each eye the suture curved gently outward, then extending horizontally, and finally directed obliquely to meet the posterior margin at the genal spine.

Cephalic border finely wrinkled and tuberculate; free cheeks radiately wrinkled. Thoracic segments? Pygidium semicircular; axis 8 rings, extending to posterior border.

Length of head 15.5 mm.; width to base of spines 59 mm.?

Upper Cambrian *Agnostus* Zone.

The large cephalon, with its conico-cylindrical glabella and wrinkled border, shows the relationship of this species to *Ptychoparia.* The author compares the species with *Olenellus sp.* Etheridge, and *O? forresti* . This species Matthew referred to *Protolenus,* Trans. Roy. Soc. Canada, Vol. 11, 1893, p. 102.

Ptychoparia minima sp. nov., p. 318, pl. 58, figs. 1 and 6?; pl. 59, fig. 22, cranidium and pygidium.

Glabella subcylindrical, long, tapering slightly anteriorly, upper surface finely pustulate; glabellar furrows three pairs; occipital furrow deeply impressed; occipital ring showing traces of a slight ridge bearing three small, blunt spines directed posteriorly; front border of the glabella nearly semicircular, but somewhat truncated, broad and depressed; palpebral lobes large, elliptical; eyes narrow, sublunate and strongly curved.

Pygidium comparatively large; axis with about 6 segments; lateral lobes moderately wide, slightly rounded and depressed in relation to the axis; margin broader than in *P. thielei,* and with conspicuous striae parallel with the border.

Upper Cambrian *Agnostus* Zone.

Affinities: The deep and depressed border of the glabella and the spinous processes of the neck ring may be compared with *Atops trilineata* Emmons.

Crepicephalus etheridgei sp. nov., p. 319, pl. 58, figs. 4 and 8; pl. 59, figs. 20, 21.

Cranidia provisionally referred to this species somewhat like that of *Sphaeropthalmus alatus,* small, semicircular, inflated.

Glabella subspherical or elongately globose, highest along the medium longitudinal line; surface faintly marked with three pairs of furrows, which are curved forward and outward from either side of the middle line; frontal border depressed, sulcated, and with an almost straight or slightly curved margin.

Occipital ring narrow; occipital furrow deeply impressed; fixed cheeks moderately broad, subtriangular, and deeply incised at the junction with the glabella; outer margin gently sloping outward posteriorly, and with a semilunar depression on the ocular margin; surface finely tuberculated.

Pygidium subquadrate; axis more than three-quarters of the length of the pygidium, with 5 rings; lateral lobe furrows at first gently sloping posteriorly, then curving sharply backward; margin with doublure and remnants of two long, diverging spines directed backward and outward.

The author compares *Crepicephalus onustus* Whitfield, with the head of his new species and the pygidium of *C. liliana* Walcott.

———— Ostracoda from the Upper Cambrian Limestone of South Australia.

On the Age of the Barnsdale Gravels, with a Note on the included Fossil Wood.—Proc. Roy. Society, Victoria, New Ser., Vol. 31, Part 1, 1918, pp. 108-174, pl. 9, 10.

The species of Ostracoda are represented by the genera *Leperditia* and *Isochilina*.

The author describes and illustrates the following species:

Leperditia tatei sp. nov.

The outline of this fossil reminded the author of the Cambrian genus *Aluta*, especially *A. enyo* Walc. The species has the general form of *Leperditia anna* Jones.

Leperditia capsella sp. nov.

The species has many points of resemblance to *L. canadensis* Jones.

Isochilina sweeti sp. nov.

From its contour one might at first be inclined to refer this species to *Aristozoe* Barrande, but that genus is more compressed and podshaped, with a nodular prominence in the anterior dorsal-region. Chapman compares *Isochilina ottawa* Jones, but this species is only half the diameter of the present Australian species and is more oblong in shape.

———— The Heathcote Fauna.—Records Geo. Sur. of Victoria, Vol. 4, Part 1, 1906, pp. 87-104, pl. 6, 7.

The following Trilobites are described:

Agnostus australiensis Chapman.

Dinesus ida Etheridge, Jr.

Saratogia cf. *hamulus* Owen; *S. rugulata* sp. nov.

Saukia cf. *Saukia* sp.

Notasaphus fergusoni gen. nov. et sp. nov.

The cephalon shows a large, tumid and expanded glabella, with about four transverse furrows. There is a well marked frontal border and the occipital ring carries a blunt spine.

Pygidium: The spines of the pygidial border vary in number from 4 to 6 on each side, corresponding to the number of pygidial segments.

The genus approaches *Dorypyge*, from which it differs in the form of the glabella, it being more expanded in front.

Notasaphus is further distinguished in the almost obsolete transverse furrows. The pygidium of *Blackwelderia* also resembles that of *Notasaphus*, but the cephalon of that genus has a glabella which is narrower and tapering in front.

Leperditia knowsleyensis Chapman.

CLARK, T. H. A New Trilobite Appendage.—Am. Jour. Sci., Vol. 4, 1922, pp. 245-248, fig. 1 in text.

The author describes the appendage of a Trilobite from the Shumardia limestone in the Lévis formation, consisting of a small fragment of the outer part of a coxopodite, a large exopodite, a fragmentary endopodite, and one

CLARK, T. H.—Continued.

or two other members in which the exopodite is by far the largest and most prominent member. Its outline, blunt at the inner end, terminating in a long spine at the distal extremity, widest beyond the middle; the posterior margin carrying a score or so of setae which are short, stout and pointed outward.

Of the genera represented in the Shumardia zone only *Isotelus* and *Triarthrus* have so far yielded recognizable appendages. In the Lévis formation the most abundant Trilobite is *Shumardia granulosa* Billings. The other genera represented in the Shumardia limestone are *Agnostus, Endymionia, Symphysurus, Telephus* and *Holometopus,* to any one of which this appendage might belong.

CLARKE, JOHN M. New Palaeozoic Crustaceans.—N. Y. State Mus., 15th Rep. of the Director, 1919, p. 129, pl. 1.

Bunaia, a new Merostome Crustacean.

Bunaia woodwardi, gen. et sp. nov.

The chief difference of *Bunaia* from *Bunodesis* is in the structure of the abdomen. In *Bunodesis* there are six broad segments, followed behind by three narrow ones.

In *Bunaia* this structure appears to be somewhat different. The cephalon is followed behind by narrow segments, of which 7 or 8 can be counted, with possibly one missing. These seem to be of somewhat unequal length and to be longitudinally ridged, but without lateral flanges.

On the three specimens known, there is a broad, detached, smooth spine lying alongside the head, which may have been the telson.

———— Crustacea from the Permian of Sao Paulo, Brazil.—N. Y. State Mus., 15th Rep. of the Director, 1919, p. 135, pl. 2, 3.

Paulocaris pachecoi sp. nov.

Gampsonyx brasilicus sp. nov.

———— Fosseis Devonianos do Paraná.—Monog. do Servico Geol. e Min. do Brazil, Vol. 1, 1913.

The following Crustacea are described and illustrated:

Homalonotus noticus sp. nov.

This fine species is quite distinctive and is the only member of the genus represented in the continental South American Devonian that shows even the slightest tendency to a spinous test.

Homalonotus herschelii Murchison.

Homalonotus (*Schyzopyge*) *paraná* sp. nov.

The species is only represented by a pygidium, which bears along the margin a series of broad, flat, but short lappets, which are continuations of the ribs. Ribs, three pairs, duplicated.

Dalmanites accola sp. nov.; *D. falklandicus* sp. nov.; *D. sp.*

Under the preoccupied term *Cryphaeus* Green, 1837, (not *Cryphaeus* Agassiz, 1832,) the author describes three new species:

Asteropyge (*Cryphaeus*) *australis* sp. nov.; *Asteropyge* Corda., 1847; *Cryphaeus* (?) *allardyccae* sp. nov.

Group *Mesembria*:

The characteristics of this section are the small, highly elevated and forward eyes, minute cheek spines which, like the genal angles, are curved upward.

Dalmanites acacia (Schwarz).

Calmonia gen. nov., genotype *C. signifer* sp. nov.

Body ovate. Cephalon short, subtriangular, bounded by a convex marginal rim; in front a short spine protruding; genal angles with spinules at the turn of the lateral margin toward the base; glabella depressed; lateral furrows 3 pairs, the first and second pairs appearing slightly fused at their

outer ends; a central circular pit faintly visible in the frontal lobe; occipital furrow deep; eyes small, schizochroal, elevated and well forward.

Facial suture with anterior branch cutting the lateral portion of the frontal lobe, its posterior branch traversing the cheek horizontally and, because of the anterior position of the eyes, located well above the occipital furrow, so that the free cheeks are small and the fixed cheeks proportionally larger.

Thorax with 11 segments; pleurae grooved, anterior ends beveled and well rounded, posterior becoming sharp or sublanceolate towards the pygidium.

Pygidium small, elongate, subtriangular; axis with 8 or 9 rings; pleurae 4 pairs, with trace of a fifth, each being divided by a low sulcus; margin not thickened, but bearing a fringe of 6 spinules on each side; a stout terminal spine, having a length equal to that of the pygidium.

Calmonia signifer micrischia var. nov.; *C. subseciva* sp. nov.; *C. ocellus* (Lake); *C. ?gonzagana* Clarke.

Pennaia gen. nov., genotype *P. pauliana* sp. nov.

A distinct variation of the Mesembria type of *Dalmanites,* more Phacopidean than *Calmonia* in respect to the cephalon, in which the parts are more compact and condensed. In the thorax the axis is relatively much broader than the side lobes, while the pleural ends of the anterior segments are rounded rather than lanceolate.

The pygidium is Phacopidean in its small size and sparse segmentation.

Proboloides gen. nov., genotype *P. cuspidatus* sp. nov.

In the possession of a frontal snout on the cephalon, this species is a Probolium after the type of northern snouted Dalmanitids; but in respect to the character of the snout, the form of the cephalon, its style of lobation and smoothness of surface, it departs from that type. The reversional character of this genus is expressed by the singular and unparalleled reappearance of spines on the lateral margin of the cephalon at the outlet of the facial sutures, and, as these lie above the normal position of the spines at the genal angles, each cheek thus bears a pair of spines.

Proboloides pessulus sp. nov.; *Proetus sp.*

A Bibliography is given on page 32 for the years 1842 to 1909.

COBBOLD, E. S. The Trilobite Fauna of the Comley Breccia-bed (Shropshire).—Abs. Proc. Geol. Soc., 1912-13, p. 12. Quart. Jour. Geol. Soc., Vol. 69, 1913, pp. 27-44, pl. 2, 3.

Paradoxides intermedius sp. nov., p. 29, pl. 2, figs. 1 a-c, 3 and figs. 2, 4, and 11 c.

The species simulates three forms, *P. hicksii,* its variety *palpebrosus* Linrs., and *P. sjögreni,* in the weakness of the glabellar furrows along the axial line, but differs in the course of the facial suture, and consequently in the general form of the cranidium, and also in the outline of the glabella.

Agraulos sp. cf. *A. quadrangularis* Whitfield, p. 31, pl. 2, figs. 15 a-c.

Subgenus *Strenuella* sp. indeter., p. 32, pl. 2, figs. 12a to 14c.

Conocoryphe aequalis Linrs., p. 32, pl. 3, figs. 18 a-c.

Conocoryphe (Liocephalus) impressa Linrs., p. 33, pl. 3, figs. 16 a-c.

Dorypyge reticulata sp. nov., p. 33, pl. 3, figs. 1a-15.

The species differs from *D. lakei,* (1) in having a rather longer eye lobe; (2) in being proportionately wider across the posterior angles of the cranidium; (3) in the surface characters; (4) in the proportionate length of the spines; (5) in the presence of pleural facets, no trace of which have been detected in *D. lakei;* (6) in the more tapering axis of the pygidium; (7) in the absence of spines on the axis; and, (8) in the diminution backward in the length of the marginal spines.

Microdiscus punctatus (Salter).

Ptychoparia (Liostracus) lata sp. nov., p. 38, pl. 2, figs. 16a-17c.

This form has many points in common with *P. (Liostracus) pulchella.* It differs however in the greater width of the glabella, the concurrent narrow-

COBBOLD, E. S.—Continued.

ness of the fixed cheeks, the absence of the ocular ridge, and in the shorter and more erect occipital spine. The eyes larger and situated more forward.

Lorenz, 1906, Zeitschr. der Deutsch. Geol. Ges., described *Liostracus latus* sp. nov., so this species becomes a synonym.

Ptychoparia (*Liostracus*) *?dubia,* p. 39, pl. 3, figs. 19a, 19b.

———— The Cambrian Horizon of Comley (Shropshire), and its Brachiopoda, Pteropoda, Gastropoda, &c.—Quart. Jour. Geol. Soc., Vol. 76, 1921, pp. 325-386, pl. 41-44.

Ostracoda:

Leperditia? lentiformis, sp. nov., Cambrian, Comley.

General form bean-shaped, anterior end shortly truncate, dorsal border gently convex for about two-thirds of the total length, then bending more rapidly and passing to the posterior rounded end in a line that is almost straight.

Ventral valve one long, fairly-regular curve from the truncate anterior to the posterior end.

Test thin, corneous, having the surface marked by a network of impressed lines.

Surface of both valves regularly convex, except near the anterior end, where there is a short, ill-defined depression passing obliquely towards the ventral border.

Chiefly differs from *L. ?dermatoides* Walcott in having a very thin membranous and punctate test, &c.

Escasona sp.?

Referred to this genus notwithstanding the fact that there is no sign of the ocular tubercle.

Bradoria? sp.

In shape like *Fordilla troyensis* Barr., as given by Walcott. It has however, a distinct marginal flat border, ventrally and at the two ends, but there is no trace of an ocular tubercle.

COLLIN, L. Le Niveau à *Phacops potieri* dans l' Ouest du Finistére.—Assoc. Franc. Av. Sci., 39, Toulouse, Part 2, 1911, pp. 44-51.

CRAMER, RUDOLF. Die Fauna von Golonog. Ein Beitrag zur Feststellung des Alters der Grauwacken Sandsteinschichten von Golonog und der entsprechenden Ablagerungen in Oberschlesien.—Jahrb. der Königl. Preuss. Geol. Landesanstalt für 1910, Bd. XXXI, Hheil 2, Heft 1, pp. 129-167, Plate 6.

Crustacea:

Griffithides mucronatus McCoy, p. 151, pl. 6, figs. 13-17.

CREPIN, A., see GOSSILET, J. A. A.

DECKE, W. Palaeont. Betrachungen VII.—Neues Jahrb. für Min., Vol. 5, 1915, pp. 112-126.

Generally on the range of fossil crustacea.

DELGADO, J. F. N. Fauna Silurica de Portugal. Descripcao de una Forma Nova de Trilobite.—Comm. des Travaux Géol. du Portugal, 1892, 31 pages, 6 plates.

Lichas (*Uralichas*) *ribeiroi.*

In a list of three horizons of the schist of de Vallonga, the author names the following crustacea:

Zone A:

Dalmanites socialis Barr., and var. *proaeva* Barr.; *D. velillarti* Rouault.

Placoparia tourneminei Rouault.

Illaenus giganteus Burm. (*I. lusitanicus* Sh.)

Asaphus nobilis Barr.; *A. glabratus* Salter; *A. delessei* Duf.

Calymene tristani Brongn.; *C. salteri* Rouault.

Zone B:

Lichas incola Barr.

Placoparia tourneminei Rouault.

Dalmanites socialis and var. *proaeva* Barr.; *D. vetillarti* Rouault.

Illaenus giganteus Burm. (*I. lusitanicus* Sh.), form wide (*I. hispanicus* Vern. & Barr.)

Asaphus nobilis Barr. (*A. glabratus* Salt. ?); *A. guettardi* Brongn.; *A. contractus* Vern. & Barr.; *A. delessei cianus* Vern. & Barr.

Ogygia desmaresti Brongn.

Calymene tristani Brongn.; *C. salteri* Rouault.; *C. pulchra Barr.*, (*C. arago* Rouault.)

Zone C:

Lichas ribeiroi Delgado; *L. aff. incola* Barr., (or sp. nov.).

Acidaspis buchi Barr.

Cheirurus claviger Beyr.; *Ch.* (*Actinopeltis*) *octolobatus* McCoy.

Dalmanites torrubiae Vern. & Barr.; *D. vetillarti caudatus*, (*D. macrophthalmus* Brongn.)

Illaenus giganteus Burm., (*I. lusitanicus* Sh.); *I. wahlenbergianus* Barrande; *I. beaumonti* Rouault.

Asaphus nobilis Barr.; *A. glabratus* Salt.; *A. guettardi* Brongn.; *A. contractus* Vern & Barr.; *A. glabratus giganteus* (or sp. nov.).

Ogygia desiderata Barr., (*Illaenus powersi* Portl.?)

Calymene tristani Brogn.; *C. salteri* Rou.; *C. pulchra* Barr.

Dionide formosa Barr.

Plumulites aff. regius Barr.

DOHRN, A. Limulus und die Trilobiten.—Jenaische Zeitschr. für Mediz. u. Naturwiss., VI, 1871, p. 622.

DOLLO, L. La paléontologie ethnologique.—Bull. Soc. Géol. Belgique. Vol. 23, 1909, pp. 377-421, pls. 7-11, figs. 1-13.

DREVERMANN, FRITZ. Die Fauna der Siegner Schichten von Seifen unweit Dierdorf (Westerwald).—Palaeontographica, Vol. 50, 1904.

DUNBAR, CARL O. Stratigraphy and Correlation of the Devonian of Western Tennessee.—Am. Jour. Sci., Vol. 46, 1918, pp. 732-756.

Not descriptive. The author notes the following Trilobites.

Lower Devonian or Helderbergian Group:

Dalmanites pleuroptyx; D. retusus sp. nov.

Phacops logani; P. hudsoni.

Homalonotus sp.

Middle Devonian:

Phacops cristata.

Dalmanites myrmecophorus.

DUNBAR, CARL O.—Continued.

———— New Species of Devonian Fossils from Western Tennessee.—Trans. Connecticut Acad. Arts and Sci., Vol. 23, 1920, pp. 148-149.

Dalmanites purduei sp. nov., p. 148, pl. 5, figs. 1-3.

The fusion of the glabellar lobes indicates that this species belongs to the group of *Dalmanites anchiops.*

Dalmanites retusus sp. nov., p. 149, pl. 5, fig. 3.

A pygidium from Perryville. The absence of a spinous extension of this rounded pygidium is sufficient to distinguish it from all other species of *Dalmanites* except *D. aspinosus* of Decker Ferry, New Jersey.

ETHERIDGE, R. The Cambrian Trilobites of Australia and Tasmania.—Trans. and Proc. Roy. Soc. South Australia, Vol. 43, 1919, pp. 373-393 and plate.

ETHERIDGE, R. and MITCHELL, JOHN. The Silurian Trilobites of New South Wales with References to Those of Other Parts of Australia. Part VI. The Calymenidae, Cheiruridae, Harpeidae, Bronteidae, &c., with Appendix.—Proc. Linnean Soc. N. S. Wales, Vol. 42, part 3, 1917, September 26, 1917, pp. 480-510, plates 24-27.

Describes and illustrates the following species:

Calymene australis sp. nov.

The chief difference between this species and *C. angustior* is the presence in the former of a fourth lateral glabellar furrow, but if future inspections of better preserved specimens of *C. angustior* show four lateral furrows, the species will probably fail.

Calymene australis may be regarded as typical, and the most characteristic trilobite of the Bowning series.

Calymene duni sp. nov.

Cheirurus (*Crotalocephalus*) *silverdalensis* sp. nov.

It is remarkable that this Bowning fossil, as is also the case with other trilobites of the same area, should possess striking features of structure common to two or more Bohemian species such as *Cheirurus quenstedti* and *C. gibbus.*

Ch. (*Crotalocephalus*) *sculptus* sp. nov.; *Ch.* (*Crotalocephalus*) sp.

Sphaerexochus mirus Beyr.

Staurocephalus murchisoni Barr.; *S.* (?) *clarkii DeKoninck; Harpes trinucleoides* sp. nov.

Ceratocephala (*Bounyongia*) subgen. nov. Genotype *B. bowningensis* sp. nov.

The new subgenus differs from others in having a pair of cephalic spines originating on the glabella in front of the occipital ring, and it is this feature on which Etheridge and Mitchell found the subgenus.

Bronteus mesembrinus sp. nov.; *B. bowningensis* sp. nov.; *B. molongenis* sp. nov.; *B. angusticaudatus* sp. nov.

Acanthopyge australis McCoy.

Corydocephalus palmata sinuata Ratte.

Trinucleus clarkei Macleary. (Clarke, Quart. Jour. Geol. Soc., Vol. 4, 1848, pp. 64-66.)

This species from the Silurian of Yarralumla is probably a species of *Harpes* mistaken for a *Trinucleus* by Clarke and Macleary.

Notes on other species of Australian Trilobites slightly known.

Asaphus Clarke, Quart. Jour. Geol. Soc., Vol. 4, 1848, p. 64.

Beyond Clarke's casual remark, nothing is known of the presence of this genus in the Silurian rocks of Australia, but from the Despatch Limestone of Zeehan, Tasmania, a single small pygidium was obtained.

Amphion Etheridge, Tasmania Rep., Sec. Mines for 1895-6.

Under the name of *A.*(?) *brevispinus* the author described two small pygidia from the Despatch Limestone at Zeehan believed to be allied to the British *A. pseudoarticulatus* Port. Genus unknown in Australia.

Illaenus DeKoninck, Pal. Nouv. Galles du Sud. pt. 1, 1876, p. 46.

The history of this genus is comprised within that of two species, one Australian, the other both Australian and Tasmanian. The former is a pygidium recorded by DeKoninck from Boree Cavern, provisionally referred to *I. wahlenbergi* Barr. The second species, *I. johnstoni,* was established in the first instance for a cephalon occurring in Despatch Limestone at Zeehan, (Etheridge, Rep. Sec. Mines for 1895-6, p. XIV. pl. fig. 3) and the name was adopted for another cephalon from near Orange, (Etheridge, Rec. Geol. Sur. N. S. Wales, 8, pt. 4, p. 319, figs. 1, 2).

Homalonotus delphinocephalus Harrison, Trans. Roy. Soc. Victoria, Vol. 7, 1866, p. 17.

Found at Moonee Ponds, near Melbourne.

This was subsequently described by McCoy as *H. harrisoni,* (Geol. Sur. Vict., Decade 3, 1876, p. 19, pl. 23, fig. 11) from a different locality, Royal Park, Flemington.

Jenkins (Proc. Linnean Soc. N. S. Wales, Vol. 3, pt. 1, 1878, p. 26, 30.) mentioned *Homalonotus* as one of the Trilobites occurring in the Hume beds of the Yass River, but which is not of the characteristic type. Probably not a trilobite but a Pteropod.

Onycopyge liversidgei Woodward, (Geol. Mag., Dec. 2, Vol. 7, p. 97,) from Bombala District, N. S. Wales.

Notasaphus fergusoni Gregory, (Proc. Roy. Soc. Vict., pt. 2, 1903, p. 155.) This is unknown to the authors as a N. S. Wales species.

Cyphaspis lilydalensis Chapman, (Proc. Roy. Soc. Vict., Vol. 28, 1915, p. 163, pl. 19, fig. 6, and pl. 16, fig. 19.)

Wilson's Quarry, near Lilydale, Victoria; not known in N. S. Wales.

Proetus (*Forbesia*) *eurycops* McCoy, (Prod. Pal. Vict., Dec. 3, 1876, p. 17, pl. 22, figs. 10, 10a.) Not known in N. S. Wales.

FINCH, G. E. Notes on the Position of the Individuals in a Group of *Nileus vigilans* Found at Elgin, Iowa.—Proc. Iowa Acad. Sci., Vol. XI, 1903, pp. 179-181, pl. 14.

Finch makes the suggestion that the species referred to *Nileus* (*Vogdesia*) *vigilans*, a trilobite of the Maquoketa bed of Iowa, was in the habit of burying itself posterior end first. In a slab containing 15 entire specimens, all of which had the cephalon extended horizontally near the surface of the stratum, and the thorax and pygidium projecting downward, the rock showed no evidence that they were in burrows, and the fact that all were in the same position indicates that the attitude was voluntarily assumed.

They appear to have entrenched themselves by the use of the pygidia, which are incurved plates readily adapted for such use, and, buried up to the eyes, to have awaited the coming of prey; but they were, apparently, smothered by a sudden influx of mud.

The form of the eye in *Vogdesia vigilans* bears out this supposition, as noted by Raymond in his paper on the Appendages, Anatomy and Relations of Trilobites, 1920, p. 102.

FIREBRIG, K. Cassides und Cryptocephaliden.—Zool. Jahrb., Suppl. 12, 1910, pp. 161-264, plates 4-8.

FLIEGEL, G. Ueber Obercarbonische Faunen aus Ost- und Südasien.—Palaeontographica, Vol. 48, 1901, pp. 91-136, figs. in text, plates 6-8.

Griffithides sumatrensis F. Roemer, p. 121, pl. 8, figs. 17, 18.

Das charakteristichste Merkmal unserer Art liegt in dem ungewöhnlich verlängerten Pygidium. Sie gehört dadurch in einer Formenkreis mit der *Griffithides elegans* Gemm. würde also zum Subgenus *Pseudophillipsia* Gemmellaro zu zählen sein, falls man in diesen Formen mehr als eine blosse Gruppe erblicken will.

FOERSTE, A. F. Silurian and Devonian Limestones of Western Tennessee.—Jour. of Geology, Vol. XI, 1903, pp. 554-583, pp. 678-715.

Palaeozoic Crustacea.

Wells (Upper Stone River) Fossils, (Ordovician):

Illaenus, resembling *I. americanus.*

Clinton Fossils, (Silurian):

Illaenus daytonensis; Illaenus, resembling *madisonensis.*

Calymene vogdesi.

Lichas breviceps clintonensis.

Brownsport Fossils, (Silurian):

Acidaspis sp.

Calymene niagarensis.

Ceraurus niagarensis.

Encrinurus sp.

Illaenus sp.

Phacops sp.

Sphaerexochus romingeri.

Linden (Helderbergian) Fossils, (Devonian):

Dalmanites pleuroptyx.

Phacops logani.

————Lorraine Fauna of New York and Quebec.—Bull. Sci. Laboratories, Denison Univ., Vol. 17, 1914, pp. 247-328, pls. 3-5.

Cryptolithus tessellatus Green, p. 317.

Calymene conradi Emmons, p. 320.

The fact is that Emmons in his description was trying to distinguish the Lorraine form from the published description of *Calymene senaria* given by Hall.

Emmons in his American Geology, 1856, p. 236, gives the following description:

Small, wide across the cheeks, cheek angles obtuse and rounded, posterior lobes of the glabella comparatively large and globular, thorax lobes very convex, with a row of tubercles in the furrows or between the axis and the lateral lobes.

The species described by Slocum, (New Trilobites from Maquoketa Beds of Fayette Co., Iowa, Field Mus. Nat. Hist., 1913, Pub. 171, p. 69, pl. 18, fig. 9) as *Calymene gracilis* sp. nov., is probably the same and agrees in general with Emmons' descriptions.

Proetus chambliensis sp. nov., p. 320, pl. 4, figs. 1 A-H.

Compared with *Proetus parviusculus* Hall, which has a rotund oval glabella, without visible lobation, the cephalon broad and flat, &c., the new species differs in a relatively longer, more oblong oval glabella, large basal lobes and indications of the middle lateral pair of furrows, with other differences.

————The Generic Relations of the American Ordovician Lichadidae.—Am. Jour. Sci., Vol. XLIX, 1920, pp. 26-50, plates 1-3.

1. Two prevalent types of glabella among European Ordovician Lichads.

2. American species doubtfully referred to the European genera *Platylichas* and *Hoplolichas.*

3. American species definitely referred to the European genus *Hemiarges.*

4. *Acrolichas* proposed for twelve American and one Irish species in which the author includes:

Lichas minganensis Bill.; *L. cucullus* M. & W.; *L. trentonensis* Conr.; *L. cornutus* Clarke; *L. harrisi* Miller; *L. hibernicus* Portl.; and doubttfully *L. jukesii* Bill.; *L. robinsi* Ulrich; *L. bicornis* Ulrich; *L. clermontensis* Slocum; and *Amphilichas rhinoceros* Slocum.

5. The area of origin of *Acrolichas.*

6. American species of *Acrolichas* formerly were referred to the European genus *Amphilichas.*

7. The pygidia of *Acrolichas* compared with those of *Metalichas.*

8. The pygidia of *Acrolichas* compared wiht those of *Platopolichas.*

9. The East Baltic genera *Hoplolichas* and *Conolichas.*

10. The East Baltic genera *Homolichas, Leiolichas* and *Metopolichas.*

11. The Bohemian Silurian genera *Corydocephalus* and *Dieranopeltis.*

12. The distribution of American species of *Acrolichas.*

13. The origin of the generic types among the cranidia of the Lichadidae.

14. The free cheeks, hypostoma and thorax of *Acrolichas.*

15. Notes on American species of *Acrolichas.*

16. Possible occurrence of *Acrolichas* in Baltic Area of Europe.

17. Bibliography.

———— Notes on *Isotelus, Acrolichas, Calymene* and *Encrinurus.*—Bull. Denison Univ., Vol. 19, 1921, pp. 65-81, 6 plates.

Isotelus brachycephalus sp. nov., p. 65, pl. 14A and 15.

The author suggests that the presence of both broad and narrow forms of *Isotelus* in the Richmond strata of Ohio and Indiana indicates the possibility that the more elongate forms (*Isotelus maximus*) may be the males, and the broader forms (*Isotelus brachycephalus*) the females of the same species.

Acrolichas(?) *shidleri* sp. nov., p. 72, pl. 17, fig. 3 a-b.

For the American species at present referred to the European genus *Amphilichas,* the author proposed the name of *Acrolichas* on account of the differences in the structure of the pygidia.

The pygidia have three pairs of ribs, all with free tips, but only the first two pairs of ribs bear median grooves; the axial lobe narrows posteriorly to an acute point which reaches the notch between the free tips of the posterior pairs of ribs.

Genotype *Lichas cucullus* Meek & Worthen.

Calymene abbreviata Foerste, p. 74, pl. 18, fig. 5 a, b.

Calymene sp. (Lorraine form), p. 75, fig. 1, pl. 18.

Calymene retrorsa minuens var. nov., p. 76, pl. 18, fig. 4.

Characteristic fossils of the Waynesville member of the Richmond formation.

Calymene sp. (West Union form), p. 77, pl. 18, fig. 8 a, b.

This form is about three-fifths as large as typical *Calymene vogdesi.* It has about the same form of the cranidium, but the anterior half of the glabella is more quadrangular and is truncately rounded anteriorly; the anterior margin of the cranidium is relatively broad, but there is no broad groove separating this border from the anterior margin of the glabella as in *C. vogdesi.*

Calymene niagarensis Hall; *C. breviceps* Raymond.

Calymene cedarvillensis sp. nov.

This large form from the Cedarville dolomite differs from *Calymene vogdesi* in having the narrow anterior border not separated from the anterior part of the glabella by a groove distinct from the general curvature of the border. Compared with *C. celebra,* its anterior border is considerably wider.

FOERSTE, A. F.—Continued.

Encrinurus ornatus Hall and Whitfield.

Encrinurus hillsboroensis sp. nov.

West Union formation at Hillsboro, Ohio.

A fragment which differs from either *Encrinurus ornatus* or *E. reflexus* in the strong posterior reflexion of the distal parts of the ribs on the pygidium. There are eight pairs of ribs and the pygidium terminates posteriorly in an acute spinose end.

———— The Kimmswick and Plattin Limestone of Northeastern Missouri.—Jour. Sci. Lab. Denison Univ., Vol. 19, 1920, pp. 175-224, plates 21-23.

Fossil Crustacea:

Amphilichas cucullus Meek & Worthen, p. 214.

Bumastus holei sp. nov., p. 214, pl. 21, figs. 15 a, b; pl. 22, figs. 15 a-n.

Casts of the head and tail. The lower side of the cranidium is characterized by shallow impressed lunettes, relatively very distant from each other, but close to the posterior margin.

Probably identtical with *Bumastus orbicaudatus* Clarke.

Bumastus rowleyi sp. nov., p. 214, pl. 21, figs. 16 a, b; pl. 22, figs. 16 a, b.

The general aspect of the cranidium resembles that of *B. ambiguus* Foerste. The cast of the lower side of the cranidium shows impressed lunettes along the dorsal groove which are separated by a distance of nearly 10 mm.

Endymionia bellatula Savage, p. 218.

Nileus sp., p. 218, pl. 23, figs. 4 a, b.

Raymond in his paper on some new Ordovician Trilobites, 1890, p. 292, referred this species to *Vogdesia*, a genus closely related to *Homotelus* and *Brachyaspis*, but which differs from both these genera in having a wider axial lobe in the thorax, and little or no trace of dorsal furrows on the pygidium.

The genotype of *Vogdesia* is *V. bearsi* Raymond from the Chazy; other species occur in the Trenton group of Illinois and Minnesota. It is also a common Trilobite in the Maquoketa of Iowa.

Proetus undulostriatus Hall, p. 219.

Pterygometopus cf. lincolnensis Branson.

Remopleurides missouriensis sp. nov., p. 220, pl. 21, fig. 17; pl. 22, figs. 17 a, b.

A cranidium which the author compares with three American species, *Remopleurides striatulus* Walc., *R. lingulatus* Ruedemann and *R. tumidus* Rued.

From the first species the Ralls County specimens have much more distinct indications of the glabellar furrows, the frontal lobe curves downward more strongly and for a greater distance, and the glabella is somewhat narrower and less flattened.

Bathyurus spiniger Hall, p. 222, pl. 22, fig. 20, (cranidium).

Ceraurinus cf. *trentonensis* Barton, p. 216.

Ceraurus cf. *bispinosus* Raymond & Barton, p. 216, pl. 21, fig. 18 a, c.

Ceraurus plattenensis sp. nov., pl. 217, pl. 21, figs. 18 a, b; pl. 23, figs. 3 a, b.

FOX, H. Geological Notes, No. 2; Supplementary Notes on the Distribution of Fossils and Rocks on the North Coast of Cornwall.—Trans. Roy. Soc. Cornwall, Vol. 12, 1904, pp. 753-759.

FRECH, H. F. Das Marine Karbon in Ungarn. Közl, 36, 1906, pp. 1-50, 50-153, figs., plates 1-6.

Trilobita:

Griffithides dolsinensis Illés, p. 29, pl. 1, fig. 1 a, b; *G. minor* Woodw., p. 28, pl. 1, fig. 2, 3; *G. mucronatus* F. Roemer, p. 29, pl. 29, fig. 5 a, b.

FUCHS, ALEXANDER. See SPRIESTERSBUCH, JULIUS.

GARDINER, G. I. See REED, F. R. COWPER.

GARDINER, G. I. and REYNOLDS, S. H. On the Igneous and Associated Sedimentary Rocks of the Glensaul District, with Palaeontological Notes by F. R. C. Reed.—Quart. Jour. Geol. Soc., London, Vol. 46, 1910, p. 253, plates XX-XXII; Palaeontological Notes, pp. 271-278, plates XXI-XXII.

Trilobita:

Illaenus weaveri Reed, p. 272.

Niobe sp., p. 272, pl. 22, fig. 3 a, b.

Nileus armadillo Dalm., p. 273, pl. 22, fig. 2 a, b.

Bathyurellus glensaulensis sp. nov., p. 274, pl. 21, fig. 1 a, b.

Bathyurus cf. *timon* Bill., p. 275, pl. 21, fig. 5b; *B. aff. nero* Bill., p. 275, pl. 21, fig. 4 a, b.

Pliomera pseudoarticulata Portl., p. 276, pl. 22, fig. 5, 6.

Encrinurus octocostatus sp. nov., p. 277, pl. 22, fig. 4 a, b.

Phacops (Chasmops) aff. odini Eichwald, p. 277.

GIRTY, GEORGE H. Preliminary Report on the Palaeozoic Invertebrate Fossils from the Region of the M'Alester Coal Field, Indian Territory.—Ann. Rep. U. S. Geol. Sur., 1897-98, pp. 539-593, pl. 60-62.

Phacops logani Hall, p. 571; *P. hudsonicus* Hall, p. 571, pl. 61, fig. 4 a-d.

Proetus protuberans Hall, p. 573.

Dalmanites pleuroptyx Green.

The author figures a large specimen of *Phacops hudsonicus*, which appears to be abundant in Tennessee and Oklahoma. The species is extremely close to *P. logani*, with which it is associated, and the only character which can be relied upon to distinguish them is the comparative size and number of facets in the eyes. The eyes of *P. hudsonicus* are smaller and have fewer lenses than those of *P. logani*.

Dr. Hall describes this species as follows: Eyes small, extending backward to the line of the first annular furrow, having an elevation of four ranges of lenses.

Dr. Troost described a similar species in 1834, Mém. Soc. Géol. France, Vol. 3, p. 94, pl. XI, fig. 1-5, from Tennessee, fig. 5 of Troost's Illustrations.

———— Fauna of the Boone Limestone at St. Joe, Arkansas. Bull. U. S. Geol. Sur., 598, 1915.

Brachymetopus? elegans sp. nov., pl. 2, fig. 6, 6a, Pygidium.

Axis of the pygidium with fourteen joints, lateral lobes with nine pairs of ungrooved ribs; a row of pointed nodes along the middle of the axis and a row a little less than half way down the sides.

The specimen is unique.

GORTANI, M. La Serie Devoniana nella Giogaia del Cogliane.—Bull. R. Con. Geol. Ital., Vol. 43, 1913, pp. 235-280, figs. in text, pl. 1-3.

GOSSELET, J. A. A., BARROIS, C., LERICHE, M. and CREPIN, A. Description de la Faune Siluro-Dévonienne de Liévin. Trilobites by J. A. A. Gosselet. Cephalopoda by A. Crépin. Lamellibranchia, Gastropoda, Conularida, Ostracoda and Merostomata by M. Leriche.—Mém. Coc. Géol. Nord., Vol. 6, No. 2, pt. 1, pp. 1-64, pl. 1-9, 1912.

GREGORY, J. W. *Cyphaspis spryi,* a New Species of Trilobite from the Silurian of Melbourne.—Proc. Roy. Soc. Victoria, New Series, 1901, pp. 179-182, plate XXII.

GURICH, GEORG. Leitfossilien: ein Hilfsbuch zum Bestimmen von Versteinerungen bei geologischen Arbeiten in der Sammlung und im Feld, Erste Lieferung Kambrium und Silur, Berlin, 1908.

Ordnung Trilobita, pp. 14-24, pl. 3-5, Kambrium.

Reich 1. Oligomeria.

Rumpfsegmente in geringer Anzahl, 2-3 oder 6.

a. Unterordnung Isopyge.

Schwanzschild dem Kopfschild ahnlich.

Fam. Microdiscidae.

Microdiscus speciosus Ford, p. 16, pl. 3, fig. 1.

Fam. Agnostidae.

Agnostus granulatus Barr., p. 16, pl. 3, fig. 3; *A. pisiformis* Linné, p. 16, pl. 3, fig. 2; *A. reticulatus* Ang., p. 16, pl. 3, fig. 4.

b. Unterordnung Heteropygia.

Das Schwanzschild weicht in form, zumeist auch inbezug auf die grösse vom Kopfschild erheblich ab; Anzahl der Rumpfsegmente nicht mehr als sechs.

Reich 2. Pleiomeria.

Rumpfsegmente in grösserer Anzahl; acht oder mehr.

c. Unterordnung Micropygia.

Rumpfsegmente sehr zahlreich, Pygidium erheblich schmäler als der Kopf, und die Anzahl der erkennbarren Segmente des Schwanzschildes zumeist geringer als die halbe Anzahl der Rumpfsegmente.

Fam. Olenellidae.

Olenellus thompsoni Hall, p. 17, pl. 4, fig. 2.

Olenellus (*Mesonacis*) *mickwitzii* Fr. Schm., p. 17, pl. 3, fig. 5.

Olenellus (*Holmia*) *kjerulfi* Linnars., p. 17, pl. 4, fig. 1.

Fam. Paradoxididae.

Paradoxides harknessi Hicks, p. 18; *P. pusillus* Hicks, p. 18, pl. 3, fig. 8; *P. oelandicus* Sjögr., p. 18, pl. 3, fig. 6; *P. hicksii* Salter, p. 18; *P. davidis* Salter, p. 18; *P. forchammeri* Ang., p. 19, pl. 3, fig. 7.

Fam. Ellipsocephalidae.

Ellipsocephalus hoffi Schloth., p. 19, pl. 5, fig. 1.

Arionellus ceticephalus Barr., p. 19, pl. 5, fig. 2.

Conocephalus sulzeri Barr., p. 19, pl. 5, fig. 3.

Fam. Olenidae.

Ptychoparia striata Barr., p. 20, pl. 5, fig. 4.

Liostracus aculeatus Ang., p. 20, pl. 5, fig. 6.

Olenus truncatus Brünn., p. 21, pl. 5, fig. 7.

Parabolina spinulosa Wahlenb., p. 21, pl. 5, fig. 8.

Eurycare latum Böck, p. 21, pl. 5, fig. 9.

Peltura scarabaeoides Wahlenb., p. 21, pl. 5, fig. 10.

Sao hirsuta Barr., p. 21, pl. 5, fig. 5.

Unterordmug Macropygia.

Pygidium gross, Rumpfsegmente meist weniger zahlreich als die doppelte Anzahl der Segmente des Pygidiums.

Fam. Dicellocephalidae.

Dicellocephalus minnesotensis Owen, p. 22, pl. 3, fig. 9.

Leitfossilien des Silurs.

Klasse Crustacca, Ordnung Trilobita, pp. 62-95, pls. 22-28.

1. Reihe Oligomeria.

Rumpfsegmente in geringer Anzahl.

1. Unterordnung Isopygia.

Pygidium dem Kopfschild an grösse gleich und von sehr ähnlicher Form.

Fam. Agnostidae Dalm.

Rumpf nur mit 2 oder 3 Segmente, Augen und Gesichtsnaht fehlen.

Agnostus tardus Barr., p. 62, pl. 22, fig. 1.

2. Unterordnung Heteropygia.

Das Pygidium weicht in form und grösse vom Kopfschild ab, Anzahl der Rumpfsegmente—. Die hierher gehörigen Formen haben entweder gar keine oder sehr grösse Augen. Gesichtsnaht nahe am Seitenrande.

Fam. Trinucleidae.

Trinucleus ornatus Sternberg, p. 62, pl. 22, fig. 2; *T. bucklandi* Barr., p. 63, pl. 22, fig. 3.

Unterfamilie Dionideae.

Dionide formosa Barr., p. 63, pl. 22, fig. 4.

Unterfamilie Ampyceae.

Ampyx tetragonus Ang., p. 63, pl. 22, fig. 5.

Fam. Aeglinidae. (The author placed the Aeglinidae with the Trinucleidae.)

Aeglina ornata Barr., p. 63; *A. prisca* Barr., p. 63, pl. 22, fig. 6.

2. Reihe Pleiomeria.

Rumpfsegmente mindestens 8.

3. Unterordnung Micropygia.

Fam. Paradoxididae.

Remopleurides radians Barr., p. 64, pl. 23, fig. 1.

Fam. Cyphaspidae.

Cyphaspis burmeisteri Barr., p. 64, pl. 22, fig. 7.

Fam. Olenidae.

Arethusina konincki Barr., p. 64, pl. 22, fig. 8.

Fam. Ellipsocephalidae.

Triarthrus becki Green, p. 64, pl. 28, fig. 3.

Fam. Harpedidae.

Harpes ungula Sternberg, p. 65, pl. 23, fig. 9.

4. Unterordnung Macropygia.

Pygidium gross, breiter als die halbe Breite des Kopfschildes, Rumpfsegment meist weniger zahlreich als die doppelte Anzahl der Ringe des Pygidiums.

1. Gruppe Opisthoparia.

Fam. Dicellocephalidae.

Ceratopyge forficula Sars, p. 65, pl. 25, fig. 1.

Fam. Asaphidae.

1. Unterfamilie Asaphinae.

Ogygia buchi Brong., p. 66. pl. 23, fig. 2.

Asaphus expansus Dalm., p. 66, pl. 24, fig. 1.

Megalaspis limbata Boeck, p. 67, pl. 23, fig. 3.

Basilicus tyrannus Murch., p. 67, pl. 23, fig. 4.

Isotelus gigas De Kay, p. 67, pl. 24, fig. 2.

2. Unterfamilie Nileinae.

Nileus armadillo Dalm., p. 67, pl. 24, fig. 3.

3. Unterfamilie Illaeninae.

Illaenus esmarcki Holm., p. 68, pl. 24, fig. 4.

Bumastus barriensis Murch., p. 68. pl. 24, fig. 5.

Fam. Bronteidae.

GURICH, GEORG.—Continued

Fam. Lichidae.

Gattung *Lichas,* p. 69; *Urolichas ribeiroi* Delgado, p. 69.

1. Reihe Lichinae.

Untergattung *Platopolichas avus* Barr., p. 69, pl. 25, fig. 2.

Hoplolichas conicotuberculatus Nieszk., p. 69, pl. 25, fig. 3.

Trachylichas scaber Beyr., p. 69, pl. 25, fig. 4.

2. Reihe Argetinae.

Untergattung *Plusiarges palmatus* Barr, p 69, pl. 25, fig. 5.

Fam. Acidaspidae.

Fam. Proetidae, p. 70.

2. Gruppe Gonatoparia.

Homalonotus brongniarti Salter, p. 70; *H. bisulcatus* Salter, p. 70, pl. 26, fig. 1.

Untergattung *Trimerus delphinocephalus* Green, p. 70, pl. 26, fig. 2.

Fam. Calymenidae.

Calymene blumenbachii Bronn., p. 71, pl. 26, fig. 4; *C. scnaria* Conrad, p. 71, pl. 26, fig. 5.

3. Gruppe Proparia.

Der hintere Abschnitt der Gesichtsnaht mündet vor den Hinterecken.

Fam. Phacopidae.

Phacops s. str.

Dalmania socialis Barr., p. 71. pl. 26, fig. 6; *D. caudata* Emm., p. 71, pl. 26, fig. 7.

Acaste downingiae Murch., p. 72, pl. 27, fig. 1.

Chasmops odini Eichw., p. 72, pl. 26, fig. 8.

Fam. Cheiruridae.

Cheirurus exsuls, p. 72, pl. 27, fig. 2; *C. insignis* Beyrich, p. 73, pl. 27, fig. 3.

Sphaerexochus mirus Beyr., p. 73, pl. 27, fig. 4.

Fam. Encrinuridae.

Cybele bellatula Dalm., p. 73, pl. 27, fig. 5.

Encrinurus punctatus Wahlenb., p. 73, pl. 27, fig. 6.

Ordnung Ostracoda.

Leperditia baltica Fr. Schm., p. 74, pl. 27, fig. 7.

Fam. Primitidae.

Beyrichia tuberculata Boll., p. 74, pl. 27, fig. 8.

Fam. Phyllocaridae.

Ceratiocaris stygia Salter, p. 74, pl. 28, fig. 4.

———— Leitfossilien, Zweite Lieferung, Devon, Berlin, 1909.

Ordnung Trilobita, pp. 150-168, plates 47-49.

1. Gruppe Opisthoparia.

Gesichtsnaht mündet am Hinterrande.

Fam. Bronteidae.

Untergattung *Thysanopeltis speciosa* Corda, p. 151, pl. 47, fig. 1.

Fam. Lichidae.

Untergattung *Euarges haueri* Barr., p. 151, pl. 47, fig. 2.

Liparges simplex Barr., p. 152; *Ceratarges armatus* Golf., p. 152.

Fam. Proetidae.

Proctus bohemicus Corda, p. 152, fig. in text, No. 41; *P. cuvieri,* p. 153, pl. 47, fig. 3; *P. cremita* Barr., p. 153, pl. 47, fig. 4; *P. crassirhachis* F. A. Roemer, p. 154.

Dechenella burmeisteri Richter, p. 154, pl. 47, figs. 5, 6; *D. verneuili* (Barr.), p. 155, pl. 47, fig. 7.

2. Gruppe Gonatoparia.

Die Gesichtsnaht endet in den Hinterecken.

Fam. Calymenidae.

Fam. Homalonotidae.

Homalonotus (Dipleura) dekayi Green, p. 156, pl. 48, fig. 1.

Homalonotus (Burmeisteria) armata Bur., p. 156, pl. 48, fig. 2.

Homalonotus (Digonus) gigas F. A. Roemer, p. 157, pl. 48, fig. 8; fig in text No. 42.

3. Gruppe Proparia.

Gesichtsnaht mündet am Seitenrande vor den Hinterecken.

Fam. Phacopidae.

Unterfamilie Dalmaninae (Dalmanitinae Reed).

Untergattung *Odontochile hausmanni* Brong., p. 159, pl. 49, fig. 1, fig. in text No. 43; *O. rhenana* Kayser, p. 159.

Cryphaeus laciniatus Ferd. Roemer, p. 160, pl. 49, fig. 2; *C. punctatus Steininger,* p. 161, pl. 47, fig. 8, and pl. 49, fig. 3; *C. barrandi* Caillaud & Oehlerts, p. 161.

Unterfamilie Phacopinae.

Vordere seitliche Querfurchen auf der Glabella undeutlich

Trimerocephalus anophthalmus Frech, p. 162, pl. 49, fig. 4.

Phacops fecundus Barr., p. 163, pl. 49, fig. 5; *P. major* Barr., p. 163; *P. superstes* Barr., p. 163; *P. fecundus* & Var. *major* Barr., p. 166; *P. breviceps* Barr., p. 166; *P. latifrons* Bronn, p. 167, pl. 49, fig. 6; *P. schlotheimi* Bronn, p. 168, pl. 49, fig. 7.

Ordnung Ostracoda.

Fam. Primitiidae.

Gattung *Bollia* & *Polyzygia,* p. 168.

Fam. Entomidae.

Entomis serratostriata Sandberger, p. 168, pl. 47, fig. 9.

Gattung Richterina Gürich, p. 169; *R. tenera* Gürich, p. 169, pl. 47, fig. 10.

Prof. H. H. Swinnerton, Classification of Trilobites, remarks, p. 494:

"The Error in Gürich's Classification:

"The mistake made by Gürich is that his main divisions are based on progressive characters, viz: differences in the number of free segments and in the size of the pygidium.

"Beecher's order, Hypoparia, exhibits the same weakness. The institution of an order Protoparia is open to the same criticism."

HADDING, ASSAR. Slaktet Telephus Barrande.—Geol. Foren. Stockh., Forhandl. 35, 1913, pp. 25-48, plates 1, 2.

Telephus bicuspis Ang., p. 43, pl. 1, figs. 1-7; *T. sp.,* p. 42, pl. 2, figs.; *T. mobergi* Hadding, p. 37, pl. 2, figs. 12-17; *T. granulatus* Ang., p. 35, pl. 1, figs. 8-10.

———— Undre Dicellograptusskiffern I. Skone jemte Nägra Därmed Ekvivalenta Bildningar.—Lunds Geologiska Fältklubb, ser. B, No. 6, 1913.

Ostracoda:

Primitia tolli Bonnema, p. 67, pl. 6, figs. 10, 11; *P. carinata* sp. nov., p. 68, pl. 6, fig. 12; *P. conchoides* sp. nov., p. 68, pl. 6, figs. 13-17.

Trilobita:

Triarthrus becki humilis, var. nov., p. 69, pl. 6, figs. 18, 19.

Megalaspis patagiata Törnq., p. 69, pl. 6, figs. 20, 21; *M. sp.*

Asaphus sp.

Hadding, Assar.—Continued.

Ogygiocaris dilatata sarsi Ang., p. 70, pl. 7, figs. 1-7, text fig. 23, pygidium; *O. dilatata lata* var. nov., p. 72, pl. 7, fig. 8, 9; *O. Dilatata strömi* Ang., p. 72, fig. 10.

Nileus armadillo Dalm., p. 72, pl. 7, figs. 11, 12.

Cheirurus exsul Beyr., p. 73, pl. 7, fig. 13.

Ampyx sp.. *A. clavifrons* sp. nov., p. 73, pl. 7, figs. 15, 16; *A.? costatus* Boeck, p. 74, pl. 7, fig. 17.

Trinucleus coscinorhinus Ang., p. 74, pl. 7, figs. 18-20; *T. efflorescens* sp. nov., p. 75, pl. 7, figs. 21a-c.

Telephus bicuspis Ang., p. 75, pl. 8, figs. 1-4; *T. sp.; T. mobergi* Hadding, p. 76, pl. 8, figs, 6-8; *T. granulatus* Ang., p. 76, pl. 8, figs. 9, 10.

Remopleurides subquadratus sp. nov., p. 76, pl. 8, figs. 11 a, b; *R. circularis* sp. nov., p. 77, pl. 8, figs. 12a, b; *R. sp.* (1); *R. sp.* (2).

Robergia microphthalma Linrs., p. 78, pl. 8, figs. 15-17 and 17a; *R. microphthalma scanica* var. nov., p. 78, pl. 8, fig. 19.

Fialoides antiquatus gen. nov. et sp. nov., p. 79, pl. 8, figs. 20a, b.

The new genus has a fixed cheek and palpebral lobes like the genus *Telephus;* the glabella and pre-glabella-like front brim reminds one of certain Conocephalidae.

Colymbus lovisae gen. nov. et sp. nov.

Cranidium only known. Glabella very convex, with glabellar basal lobes; palpebral lobes bending backward and extending to the base of the glabella, cutting the occipital furrow near the dorsal furrows; facial sutures on their anterior branches running from the palpebral lobes laterally outward and forward and finally crossing the wide part of the fixed cheeks, bow-like, over the frontal limb; glabella not extending to the frontal border.

The form is somewhat similar to species assigned to *Proetus* and *Cyphaspis,* but the facial sutures differ in the strongly outward direction of the anterior branches, also the semicircular palpebral lobes.

On account of these characteristics Hadding referred it to a new genus.

Hector, J. On a New Trilobite (*Homalonotus expansus*).—Trans. & Proc. of the New Zealand Inst., Vol. IX, 1877, p. 602.

Hede, J. Ernhold. Skänes colonusskiffer, 1.—Lunds Geologiska Fältklubb, ser. B, No. 9, Bd. 26, No. 6, 1915, pp. 165, plates 1-4, with English summary.

Trilobita:

Ampyx rouaulti Barr.

Dalmanites mobergi sp. nov.; *D. simricus* sp. nov.

Acidaspis mira Barr.; *A. cardiolarum* sp. nov.

Proetus gracilis Barr.

Phyllocardia:

Aptychopsis prima Barr.

Cryptocaris scanica sp. nov.

The new species, *Dalmanites mobergi,* pl. 4, fig. 3-8, is described as follows: Cephalon parabolic, convex; genal angles produced into spines; glabella widening anteriorly, glabellar furrows deep and nearly straight; frontal lobe produced in front, with both exterior sides rectilinear, equaling in length the remaining part of the glabella, not including the occipital ring. Glabella with three pairs of furrows, the first deepest and somewhat oblique, the second perpendicular to the axis and increasing in depth inward, the third nearly parallel with the second, but, in the inmost part a little more directed forward, here being subparallel with the occipital furrow. Occipital ring rather convex, broadest at the middle. Test of the glabella covered with fine granules and scattered, greater and smaller tubercles; also the same kind of granulation to be observed on the cheeks. Flattened lateral border bounded inward by a

strong furrow, which cannot be followed farther than the frontal lobe. Interior of the checks only slightly convex. Eyes, which have big facets, occupying the distance between the first and third lateral furrow. Anterior branch of the facial suture, at first directed a little outward, in the main following the axial furrows; posterior branch at first curving obliquely forward and outward, then turning bacwkard, at last cutting the outer margin at a very acute angle. Thoracic axis about one-third the width of the segments, limited by strong furrows and having a nearly semicircular section.

Dalmanites simricus sp. nov.

Pleurae strongly curved downward in the outer half, furnished with strong, oblique grooves, and ending in points which are slightly bent up.

Test of the thorax covered with fine and close granulation, and the posterior part of each ring with well developed tubercles.

Pygidium nearly semicircular, with the posterior border evenly rounded; length three-fifths of breadth; axis with deep axial furrows, conical, rather convex, occupying four-fifths of the total length and three-tenths of the anterior margin; disregarding the anterior half ring, the axis having eight distinct rings, separated by broad and deep furrows; sides convex, with seven ribs, all of which are well marked, and with an oblique median furrow desisting inside the flat limb; posterior portion of the foregoing segment somewhat elevated above the anterior portion of the following one; axis and sides provided with tubercles which, on the rings, as well as on the lateral lobes, are arranged almost like a string of pearls; granulation quite missing in the furrows, more marked on the posterior than on the anterior portion of each segment. Hypostoma about as long as wide, transversely slightly convex. Anterior margin nearly straight, posterior margin somewhat parabolic; centrum bounded posteriorly by a shallow furrow at the ends of which the maculae are placed, these being directed obliquely forward and outward.

———— Gottlands Silurstratigrafi.—Sveriges Geol. Undersökning, Ser. C, No. 305, 1921, pp. 100, map.

Gives table of the fossils of Gotland, pp. 88-100.

HENNIG, E. Neue Phyllocariden und Isopoden aus rheinischen Unter Devon.—Zeitschr. Deutsch. Geol. Ges., Vol. 72, Monatsh., p. 292, 1921.

HERRMANN, FRITZ. Berichte über die Versammlungen des niederrheinishen geologischen Vereins; beziehungsweise Sitzungsberichte D, beigeheftet den Abhandlungen des Naturhisttorischen Vereins der preussischen Rheinlande und Westfalens, Bonn, 1907; 64 Jahrgang.—Neue Fossilfunde in Hessen, von F. Herrman, (Marburg), p. 40.

Bei Hermershausen, unweit Marburg, fanden sich in Kalkknellen, die anstehend zwar nicht bekannt sind, die wir aber nach der in ihnen enthaltenen Fauna als Einlagerungen in den Wissenbacher Schiefern vom ungefähren Alter des Ballersbacher Kalkes auffassen müssen, zahlreiche Pygidien und Kopfschilder des bekannten *Trimerocephalus micromma* A. Röm., *Phacops fugitivus* Barr.

Interessant ist dieses Vorkommen einmal wegen der lokalen Häufung diese sonst nur vereinzelt in den Schiefern, ganz selten aber in den Kalkeinlagerungen (Laddekenthal, Leun) auftretenden Trilobiten, dann aber auch besonders aus den Grunde, dass wir hier zum ersten Male eine Menge gut erhaltener Pygidien dieser sonst nur nach ihren Kopfschildern bestimmten Art vor uns haben.

Die einzige erwähnenswerte Abbildung eines Pygidiums findet sich bei Barrande (Syst. sil. I Suppl. Taf. IX, fig. 2), stellt jedoch nur einen Steinkern dar. Das Pygidium zeichnet sich nun durch starkes zurücktreten der Segmentation aus, der art, dass auf der Oberfläche meist überhaupt nichts mehr davon zu bemerken ist und ein Habitus zu Stande kommt, der allerdings sehr an den der untersilurischen Asaphiden (Z. d. D. g. G. 1906, Monatsberichte, p. 213, p. 41) erinnert. Hingegen ist auf der Unterseite der Schale sowie auf

HERRMANN, FRITZ.—Continued.

dam Steinken eine schwache, aber deutliche Segmentation verhanden, entsprechend derjenigen, die wir auf der erwähnten Barrandeschen Abbildung wahrnehmen.

Trimerocephalus micromma gilt seit langer Zeit als Leitfossil der Wissenbacher Schiefer. Ich vermute, dass alle die schwach oder kaum gerippten Pygidien, die sich in diesen Schichten finden hierher zu rechnen sind. Ein Vergleich mit den sonst noch auftretenden Phacopiden aus der Gruppe des *Ph. fecundus, (fecundus, breviceps, zorgensis,* etc.) die sich sämtlich durch ganz grob geripte, z. Tl. auch granulirte Pygidien auszeichnen, läst eine Verwechslung mit den Pygidien von *Trim. micromma* selbst bei weitgehender Verdrückung oder Auswalzung ausgeschlossen erscheinen.

Trim. micromma ist demnach nicht nur in seinen Kopfschildresten, sondern auch in seinen Pygidien bei der allgemeinen Fossilarmut der Wissenbacher Schiefer ein brauchbares Leitfossil, das bereits in weitentfernten Gebieten (Catalonein, Rheinisches Schiefergebirge, Harz, Thüringen, Böhmen) in äquivalenten Schichten (Stufe des Ballersbacher Kalkes) gefunden worden ist.

———— Ueber das Paläozoicum am Ostrande des Rheinischen Schiefergebirges.—Jahrb. des Nassauischen Vereins für Nat. in Wiesbaden, 64 Jahrg. 1911, pp. 1-49, plates 3.

Crustacea, pp. 27-34.

Trimerocephalus micromma A. Roemer, p. 27, pl. 2, figs. 1a-c.

Phacops kayseri sp. nov., p. 29, pl. 1, fig. 5; pl. 2, figs. 2a-c.

Cheirurus gibbus Beyrich, p. 30, pl. 2, fig. 3.

Cyphaspis hydrocephala A. Roemer, p. 30, pl. 2, fig. 4; *C. coronata* Barr., p. 31, pl. 2, fig. 5.

Proetus aff. dormitans Richt., p. 32, pl. 2, fig. 6; *Proetus* sp., p. 33, pl. 2, fig. 7.

Entomis sp., p. 34.

———— Das hercynische Unterdevon bei Marburg a. L.—Jahrb. der Königl. Preuss. Geol. Landesanstalt für 1912, Bd. XXXIII, Theil 1, Heft 2, pp. 305-395, plates 18-23, with Geological Map.

Crustacea.

Kalkige Grauwacke.

Phacops fecundus major Barr., p. 321.

Dalmanites cf. *tuberculatus* A. Roem., p. 321.

Proetus eremita Barr., p. 322.

Bronteus sp., p. 323.

Kalk mit *Rhynchonella princeps.*

Phacops fecundus major Barr., p. 343, pl. 20, figs. 1a, b.

Dalmanites (Odontochile) tuberculatus A. Roem., p. 344, pl. 20, fig. 2a, b.

Cyphaspis hydrocephala A. Roem., p. 345, pl. 20, figs. 3a, b.

Acidaspis cf. *glabrata* A. Roem., p. 343.

Proetus marburgensis sp. nov., p. 346, pl. 20, figs. 4a, b.

Schönauer Kalk.—Knollenschiefer.

Phacops sternbergi Corda, p. 359, pl. 22, fig. 1; *P. intermedius* Barr., p. 360, pl. 22, figs. 2, 3; *P. zorgensis* Kayser, p. 361, pl. 22, figs. 4a, b; *P. bronni* Barr., p. 361, pl. 22, fig. 5.

Trimerocephalus aff. micromma A. Roem., p. 362, pl. 22, figs. 6, 7; *T. sp.,* p. 362.

Cheirurus (Crotalocephalus) cf. *gibbus* Beyrich, p. 363, pl. 22, fig. 14.

Lichas sexlobatus A. Roem., p. 363, pl. 22, fig. 9.

Proetus lepidus Barr., p. 365, pl. 22, figs. 10-11; *P. sp.,* p. 366, pl. 22, fig. 12.

Dalmanites (Odontochile) cf. *reussi* Barr., p. 366, pl. 22, fig. 13.

———— Neue Fossilfunde in Hessen (Silurian Trilobites).—Sitz. naturh. Ver. Preuss. Rheinl., 1907, pp. 40-41, 1908.

HOLUB, K. Ueber eine neue Fauna des Untersilurs in der Umgebung von Rokycany und Nachträge.—Bull. Internat. Acad. des Sciences de Bohéme, 1911 and 1912.

HOLM, G. Kinnekulle Des Geologi och den Tekniska Anvàndningen af dess Bercarter.—Sveriges Geol. Undersökning, Ser. C, No. 172, 1901.

Illustrates *Agnostus parvifrons* Linrs.; *A. laevigatus* Dalm.; *A. pisiformis* Linné.

Leperditia primordialis Linrs.

Sphaerophthalmus alatus Boeck.

Peltura scarabacoides Wahl.

Ceratopyge forficula Sars.

Euloma ornatum Ang.

Niobe insignis Linrs.

Pygidium of *Megalaspis limbata* Boeck; *M. heros* Dalm.

Chasmops sp.

Beyrichia costata Salter.

Cryptolithus wahlenbergi Rouault.

Pygidium of *Homalonotus platynotus* Dalm.

Dalmanites mucronatus Brogn.

HOLTEDAHL, DR. OLAF. The Cambrian-Ordovician Beds of Bach Peninsula and the Neighboring Ellesmere Land.—Videnskabs-Selskabet of Kristiania, 1913, No. 28, of the Report on the Second Norwegian Arctic Expedition in the Fram, 1898-1902.

Dr. Holtedahl figures a cranidium and a free cheek and pygidium as *Ptychoparia sp.* from Cape Camperdown.

From the *Orthoceras* limestone of Cape Victoria Head Dr. Holtedahl figures a cranidium of another *Ptychopyge* and a cranidium of *Illaenurus,* also a *Bathyuriscus* with a figure of a pygidium.

From Norman Lockyer Island, about eight miles directly north of Victoria Head, Dr. Holtedahl lists, with other fossils, *Thaleops ovatus* Conrad.

———— On the Fossil Fauna as from Pere Schei's Series B in Southwestern Ellesmere Land.—Videnskabs-Selskabet of Kristiania, 1914, No. 32 of the Report on the Second Norwegian Arctic Expedition in the Fram, 1898-1902.

Dr. Holtedahl lists three Niagaran species and *Ceraurus sp.*

———— Ueber einige Norwegischen Oleniden.—Norsk. Geol. Tidsskr., Vol. 2, 1910, pp. 1-24, plates 1-3.

Parabolina spinulosa, pl. 2, fig. 13.

Leptoplastus ovatus, p. 8, pl. 1, figs. 4-9; *L. bröggeri* sp. nov.; *L. explanatus* sp. nov.; *L. longispinus* sp. nov.

Peltura praecursor, p. 14, pl. 2, figs. 1-10.

Eurycare norvegicum sp. nov.

HOLZAPFEL, E. Das Obere Mitteldevon (Schichten mit *Stringocephalus burtini* und *Maeneceras terebratum*) im Rheinischen Gebirge.—Abhandl. der Königlich Preuss. Geol. Landesanstalt, N. F., Heft 16, 1895.

Crustacea.

Trilobita:

HOLZAPFEL, E.—Continued.

Bronteus novaki sp. nov., p. 10, pl. 2, figs. 11-14; *B. sp.; B. granulatus* Goldf., p. 13, pl. 13, figs. 5-10; pl. 16, fig. 18.

Phacops kocneni sp. nov., p. 16, pl. 2, figs. 8-10; *P. breviceps,* p. 18, pl. 12, figs. 10, 14; *P. batracheus* Whidb., p. 20, pl. 3, fig. 13; *P. latissimus* sp. nov., p. 21, pl. 3, fig. 14; *P. hyla* sp. nov., p. 21, pl. 3, fig. 12.

Cheirurus sternbergi Boeck, p. 22, pl. 1, figs. 2-4; pl. 2, figs. 15, 16; pl. 3, figs. 1-10; pl. 12, fig. 15.

The author refers the following species to the synonymy of this species:

Ch. myops Roemer, 1850, *Ch. gibbus* Sandberger, 1856, *Ch. articulatus* Salter, 1864, *Ch. myops* Holz., 1882, and *Ch. pengellii* Whidborne, 1889.

Lichas decheni sp. nov., p. 30, pl. 5, fig. 5; pl. 17, figs. 17, 18, 20; *L. araneus* sp. nov., p. 32, pl. 3, fig. 11; p. 13, figs. 1-3, 16.

Proetus crassirhachis A. Roemer, p. 35, p. 1, figs. 6, 8, pl. 2, fig. 22; *P. quadratus* Maurer, p. 35, pl. 12, fig. 9; *P. crassimargo* Roem., p. 36, pl. 1, figs. 7-9, 18; pl. 2, figs. 22, 25; *P. suborbitatus* sp. nov. p. 38, pl. 13, figs. 13, 14, 17-19; *P.* cf. *astyanax* Corda, p. 40, pl. 13, fig. 1.

Cyphaspis convexa Corda, p. 40, pl. 2, fig. 6; *C. cerberus* Barr., p. 42, pl. 2, figs. 5, ?21.

Arethusina kayseri sp. nov., p. 43, pl. 2, fig. 7; *A. beyrichi* Novak, p. 44.

Harpes socialis sp. nov., p. 45, pl. 1, fig. 1; pl. 2, figs. 1, 3; *H.* cf. *macrocephalus* Golf. p. 47.

Ostracoda:

Aristozoe sp., p. 48, pl. 13, fig. 22.

HUBBARD, G. D. See STAUFFER, CLINTON B.

HUNEFELD, F. L. Chemische Untersuchung der Deckelitheile der Entomostraciten Trilobiten.—Schweigger's Journal, 1831, and Isis.

JAEKEL, O. Ueber einen neuen Phyllocariden aus dem Unterdevon der Bundenbacher, Dachschiefer.—Zeitscher, Deutsch Geol. Ges., Vol. 72, 1921, pp. 290-292, fig.

JAROSZ, J. Fauna des Kohlenkalk in der Umgebung von Krakan, Ier. Theil, Trilobiten.—Bull. Intern. Acad. Sci. Cracovie, 1909, pp. 371-384, Pl. XI.

JULIEN, A. Le Terrain Carbonifère Marin de la France Centrale.—Paris, 1896, pp. I-XXIV, 1-304, Figs. in text, plates I-XVII.

KATZER, F. Entgegnung auf Herrn Dr. J. F. Pompeckj's Bemerkungen in diesen Verhandlungen (*Ellipsocephalus germeri*).—Verh. K. K. Geol. Reichsanst, 1900, p. 370.

KAYSER, E. Devonfossilien vom Bosporus und von der Nordküste des Marmara-Meeres.—Beiträge zur Palaeont. Oest-Ung. 12, Heft 1, 1898.

KEGEL, WILHELM. Der Taunusquarzit von Katzenelnbogen.—Abhandl. der Königlich preuss. Geol. Landesanstalt, N. F., Heft 76, 1913, pp. 1-162, with 6 plates.

Trilobita:

Homalonotus (Digonus) rhenanus Koch, p. 27, pl. 2, fig. 2; *H. (Digonus) aff. gigas* F. A. Roem., p. 28, pl. 2, fig. 3; *H. ornatus* Koch, p. 30, pl. 2, fig. 4; *H sp.,* p. 31, pl. 2, fig. 5.

Cryphaeus drevermanni Richter, p. 32, pl. 6, fig. 2; *C. richteri* sp. nov., p. 33, pl. 2, fig. 7; *C. sp.,* p. 34, pl. 2, fig. 8; *C. intermedius* sp. nov., p. 36, pl. 2, fig. 9.

Ostracoda:

Kloedenia kayseri sp. nov., p. 38, pl. 2, fig. 10.

Beyrichia nassoviensis sp. nov., p. 39. pl. 2, fig. 1; *B. roemeri* Kayser, p. 40, pl. 2, fig. 12.

KERFORNE, F. Le Niveau à *Trinucleus burcaui* dans le Massif Armoricain et en particulier dans la Presqu'ile de Crozon.—Bull. Soc. Sci. N. Med. Ouest Rennes, Vol. 4, 1895, p. 248-250.

———— Description de Trois Nouveau Trilobites de l'Ordovicien de Bretagne.—Bull. Sci. Géol. France, Ser. 3, Vol. 29, 1890, pp. 783-791, pl. 13.

KIAER, — The Lower Cambrian *Holmia* Fauna at Tømten in Norway.—Kristiania, 1919, 4 to 14 plates.

KING, W. B. R. Sedgwick Museum Notes: Notes on the Genus *Sphaerocoryphe*.—Geol. Mag., Vol. 57, 1920, pp. 532-534, plate 13.

Sphaerocoryphe thompsoni Reed.

The author remarks:

A study of the hypostoma of *Staurocephalus* confirms the view that it should be removed from the Cheiruridae, but it does not seem to indicate that it should be put into the Encrinuridae, unless it branched off from some very early form before the characteristic frontal tongue was developed.

The hypostoma of *Sphaerocoryphe thompsoni* is similar in type to the typical Cheirurid hypostoma, such as *C. bimucronatus*. In *Deiphon* there is the same central spherical raised portion separated by the marked groove from the raised marginal ring. The hypostoma of *Sphaerocoryphe thompsoni* is slightly smaller than the swollen frontal part of the glabella, the general outline is square, formed of a large central, raised elliptical portion, surrounded by a deep, wide groove and raised narrow margin. At the lateral extremity of the frontal ridge the groove reaches the margin of the hypostoma, thus forming a break in the raised marginal ring. This also makes two notches in the general square outline. The lateral margins are raised and thickened. The central part of the posterior border is bent slightly towards the center of the hypostoma. There are indications of a small pit in the groove opposite the posterior edge of the notch. Surface finely granulated.

KITTL, ERNST. Geologie der Umgebung von Sarajevo.—Abd. Johrbuche der K. K. Geol. Reichsanstalt, Bd. 53, Heft 4, 1903.

Phillipsia bittneri sp. nov., p. 680, pl. 21, figs. 30-32.

Kittle gives this new name for Bittner's *Phillipsia* sp., Jahrb. der k. k. Geol. R. A., p. 365. 1880.

A somewhat similar form to the new species is *Proetus posthumus* Richter, 1864, from the Culm beds of Thuringia.

KLOUCEK, CELDA. Nàlez Trilobitü vd/1 a.—Zvlastni otisk Z. vestniku Kral. Ceské Spolecnosti Nauk. U., pp. 1-5, Praze, 1914.

Resumé en allemand Trilobitenfund in d/1 a Prage, 1914.

The author announces the discovery in the Southeast of Bohemia, environs of St. Benigna, of a fauna of Trilobites belonging to the families Olenidae, Asaphidae and Cheiruridae.

———— Ueber den Geologischen Horizont des Erzlagers bei Karyzek.—Bull. Internat. Acad. Sci. de Bohème, 1913, pp. 1-5, plate.

Illaenus perneri sp. nov. Remarkable for the subtrapezoidal form of its pygidium.

KLOUCEK, CELDA.—Continued.

———— Ueber die d/1 Schichten und ihre Trilobitenfauna.—Bull. Internat. Acad. Sci. de Bohème, 1916, pp. 1-16, plate.

The author mentions that certain forms have affinities with Cambrian genera. *Dicellocephalus* (*Dicellocephalina*) *bohemica* reappears in d/1.

The new genus and species are listed in Novak & Perner's paper, 1918.

Trilobiten in d. y. a. p. 8.

Aeglina prisca Barr., p. 9; *Ae. prisca synophthalma* Klou., p. 9; *Ae. princeps praecedens* Klou., p. 9; *Ae. kossleri* Holub, sp. nov., p. 9; *Ae. bergeroni* Novak, p. 9.

Bohemilla stupenda praecedens Klou., p. 10.

Dalmanites atavus Barr., p. 10; *D. barroisi* Novak, p. 10.

Dikelocephalina (*Dicellocephalus*) *bohemica* Novak p. 10.

Dionide prima Klou.

Holometopus (*Illaenus*) *bohemicus* Barr., p. 11.

Barrandia bohemica Novak, p. 11.

Bumastus avus Holub, p. 11; *B. pragensis* Klou.

Illaenus cf. *advena* Barr., p. 11.

Agnostus tullbergi Novak, p. 12; *A. perrugatus caducus* Barr., p. 12.

Trilobiten in d/1 y b.

Aeglina speciosa synophthalma Klou., p. 13; *Ae. princeps* Barr., p. 13, plate, fig. 7; *Ae. prisca longicephala* Klou., p. 13; *Ae. monophthalma* Klou., p. 13, plate, fig. 4.

Ampyx sp. nov., p. 14.

Placoparia zippei tumida Klou., p. 14.

Platypeltis ? longicauda Klou., p. 14.

Bohemilla stupenda Barr., p. 14, plate, fig. 10.

Trinucleus bucklandi praecedens Klou., p. 14.

Dalmanites oriens mytoensis Klou., p. 15; *D. atavus novaki* Klou., p. 15.

Illaenus perneri? glabra Klou., p. 15.

Sarkia bohemica Klou., gen. nov. et sp. nov.

———— Le genre *Bohemilla* Barrande.—Bull. Internat. Acad. Sci. de Bohème, 1920.

Bohemilla stupenda Barr., fig. in text.

The author remarks that there is as much difference between *Aeglina* and Bohemilla as there is between *Aeglina* and *Telephus*. He gives a table showing these differences.

KNOD, REINHOLD. Devonische Faunen Boliviens.—Neues Jahrb. für Min. Beil, Bd. 25, 1908, pp. 493-600, pl. 21-31.

Trilobita:

Acaste acutilobata sp. nov., p. 497, pl. 21. figs. 5, 5b, pl. 31, fig. 5; *A. convexa* Ulrich, p. 499, pl. 21, fig. 4.

Dalmanites clarkei Ulrich, p. 500; *D. maccurua* Clarke, p. 500, pl. 21, fig. 3. *Cryphacus giganteus* Ulrich, p. 501, pl. 21, fig. 2.

Phacops sp., p. 501; *Homalonotus kayseri* Thomas, p. 502.

Ostracoda:

Beyrichia argentina Thomas, p. 502.

KNOD, R. VON, and STEINMANN, —. Beiträge zur Geologie und Palaeontologie Südamerikas. Neues Jahrb. für Min., Vol. 25, 1908, p. 493-600, pl. 21-31.

KOENEN, A. VON. The Culm Fauna from Herborn.—Neues Jahrb. für. Min. Geol. Palaeont.. 1879, p. 309, plates 2.

Dr. Koenen gives descriptions, but does not figure *Phillipsia aequalis* H. von Meyer or *P. latispinosa* Sandberger.

The author (p. 312) places Richter's *Proetus posthumus* with von Meyer's species *Phillipsia aequalis* and observes "As von Meyer expressly says that the glabella is reduced in front, there is no doubt that Burmeister was in error in figuring as this species a form with a club-shaped glabella."

Woodward remarks that Emmrich's restored figure does not give a good representation of the species, the cephalon is too long, the eyes placed too far in front, and the glabella too slightly reduced in front.

Kayser, and also Leyh, refer *Phillipsia latispinosa* Sandb. to *P. aequalis.* Leyh's figure, pl. 17, fig. 3, of *P. aequalis* has the genal angles of the cephalon extended in somewhat long spines.

———— Ueber die Organization der Trilobiten.—Verhandl. d. Nat. Ver. d. Preussreindl. &c., Vol. 29, 1872, pp. 93-95.

———— Unterseite Trilobiten.—Neues Jahrb. f. Min., Bd. 1, 1880 pp. 430-432, pl. 8.

KOZLOWSKI, R. Fossiles Dévoniens de l'Etat de Paraná (Brésil).—Ann. Paléont., Paris, Vol. 8, 1913, pp. 105-123, pl. XI-XIII.

LAKE, PHILIP. A Monograph of the British Cambrian Trilobites.—Palaeontographical Soc., 1917; Part V, 1919, pp. 89-120, pl. 11-14.

Crustacea:

Ctenopyge directa sp. nov.

Leptoplastus salteri (Callaway). This is the *Conocoryphe salteri* of Callaway, 1874, p. 196.

Eurycare sp.

Peltura scarabaeoides (Wahl.); *P. punctata* C. & S.; *P. olenoides* (Salter).

Beltella gen. nov., Genotype *B. depressa* (Salter).

Cephalon semicircular, with broad margin, genal angles produced into spines. Glabella quadrate or conical, truncate or rounded in front, separated from the marginal furrow by a frontal limb as wide as, or wider htan the margin; outer surface of the test of the glabella probably devoid of furrows, but the internal casts usually showing two pairs, the posterior pair being very oblique and nearly reaching the occipital furrow.

Facial suture starting at the outer edge of the anterior margin, close to the middle line, and running very obliquely outward across the margin; from the inner edge of the margin passing inward to the eye and thence outward to the posterior margin, cutting it well within the genal angle.

Thorax, 12 segments.

Pleurae, outer part bent down and faceted; in the anterior segments the terminations appearing to be rounded or bluntly pointed; in the later segments falcated or spined.

Pygidium small and entire.

The eyes of *Beltella* are placed farther forward than in *Loganellus, Liostracus* or *Ptychoparia,* and the ocular ridge is much less distinct.

Protypus hitchcocki (Whitfield) shows many points of resemblance to *B. depressa.* The general shape is similar, the glabellar furrows are obsolete, the number of thoracic segments is the same, the pleural grooves are of the same character and the tail is small and entire. But the ocular ridge is much more strongly marked, and the facial suture is describbed as cutting the margin at right angles. The divergent course of the anterior branches of the facial suture distinguishes *Beltella* from all the other genera of Olenidae, sensu lato, except *Parabolinella.*

Lake, Philip—Continued.

Beltella bucephala (Belt); *B. varisimilis* (Salter).
Parabolinella simplex (Salter)
Angelina sedgwicki (Salter).
Dikelocephalus discoidalis Salter; *D. celticus* Salter.
Dikelocephalina furca (Salter).
Apatokephalus.

———— The Limbs of Trilobites.—Knowledge, Vol. XIX, 1896, p. 68.

Lamansky, W. Die Aeltesten Silurischen Schichten Russlands, Etage B.—Mémoires du Comité Géologique Nouvelle, Série Livr. 20, 1905.

Trilobita:

Asaphus lepidurus and Megalaspis gibba, p. 58, B/y.

Asaphus expansus and A. lamanskyi, p 56, B/a.

Asaphus raniceps, p. 58, B/3, b.

Asaphus eichwaldi and Ptychopyge globifrons, p. 59, B/3, y.

Asaphus, sensu stricto, p. 61.

Asaphus priscus sp. nov., p. 61.

Asaphus bröggeri; A. lepidurus; A. expansus; A. lamanskyi; p. 62.

Asaphus acuminatus; A. raniceps; A. major; A. eichwaldi; p. 63.

Onchometopus volborthi; O. schmidti sp. nov., pl. 1, fig. 4; *O. stacyi;* p. 63.

Nileus armadillo; Niobe laeviceps; N. linnarssoni; N. frontalis; N. emarginula; Pseudasaphus globifrons; P. tecticaudatus; Ptychopyge angustifrons; p. 65.

Ptychopyge wöhrmanni, p. 67.

Ptychopyge inostranzewi sp. nov., pl. 1, fig. 5.

Megalaspis leuchtenbergi sp. nov., pl. 1, fig. 2.

Megalaspis pogrebowi, pl. 1, fig. 3.

Illaenus esmarckii; I. laticlavus; I. ladogensis; I. centrotus; p. 67.

Pterygometopus sclerops; P. trigonocephalus; Cheirurus ornatus; C. insignis; Cyrtometopus clavifrons; C. affinis; p. 68.

Cyrtometopus cf. *aries; C. gibbus; C. tumidus; Amphion fischeri; A. brevicapitatus* sp. nov., B/3/by; *Cybele bellatula genuina;* p. 69.

Metopias celorrhina, and var. *coniceps; M. pachyrrhina; M. verrucosa; Harpes spaskii; Remopleurides nanus; Ampyx linnarssoni; A. nasutus; A. volborthi;* p. 70.

Triarthrus angelini Linrs., pl. 1, fig. 1.

Lankester, E. Ray. Extinct Animals. London, 1905, pp. I-XXII, 1-331, 292 Illustrations.

Lankester associated the Trilobites with the Meostomata in the Arachnida.

La Touche, J. D. Handbook on the Geology of Shropshire.—London, 1884, with 21 plates.

Order Trilobita, pp. 37-41.

Fam. 1. Remopleuridae, *Remopleurides* sp., pl. 3, fig. 57, Caradoc.

Fam. 2. Olenidae, *Olenus salteri,* pl. 1, fig. 7; *O. triarthrus,* pl. 1, fig. 6, Longmynd.

Fam. 3. Conocephalidae, *Conocoryphe monile,* pl. 1, fig. 9, Longmynd.

Fam. 4. Phacopidae, *Phacops caudatus,* pl. 10, fig. 249; *P. longicaudatus,* pl. 10, fig. 250; *P. downingiae,* pl. 10, fig. 246, Wenlock.

Phacops macrourus, pl. 3, fig. 66; *P. apiculatus,* pl. 3, fig. 67, Caradoc.

Fam. 5. Calymenidae, *Calymene blumenbachii,* pl. 10, fig. 242; *C. tuberculosa,* pl. 10, fig. 243, Wenlock.

Calymene parvifrons, pl. 1, fig. 22, Tremadoc

Calymene cambrensis, pl. 2, fig. 40, Landeilo.

Calymene caractaci, pl. 3, fig. 61, Caradoc.

Homalonotus delphinocephalus, pl. 10, fig. 250, Wenlock.

Homalonotus knighti, pl. 17, fig. 556, Ludlow.

Homalonotus bisulcatus, pl. 3, fig. 62, Caradoc.

Fam. 6. Proetidae, *Proetus stokesii,* pl. 10, fig. 257; *P. latifrons,* pl. 10, fig. 258, Wenlock.

Genus *Cyphaspis.*

Genus *Phillipsia, Phillipsia seminifera,* pl. 20, fig. 714, Carboniferous.

Fam. 7. Lichadae, *Lichas anglicus,* pl. 10, fig. 259, Wenlock.

Lichas laxatus, pl. 3, fig. 63, Caradoc.

Fam. 8. Acidaspidae, *Acidaspis barrandei,* pl. 10, fig. 237; *A. brightii,* pl. 10, fig. 239-241, Wenlock.

Acidaspis caractci, pl 3, fig. 64, Caradoc.

Fam. 9. Trinucleidae, *Trinucleus lloydii,* pl. 2, fig. 32; *T. gibbsii,* pl. 2, fig. 33, *Arenig.*

Trinucleus murchisoni, pl. 1, fig. 19, Tremadoc.

Trinucleus concentricus, pl. 3, fig. 55, Caradoc.

Genus *Ampyx nudus,* pl. 2, fig. 35; *A. salteri,* pl. 2, fig. 34, Arenig.

Ampyx pennatus Salt. Mss., pl. 3, fig. 56, Caradoc.

Fam. 10. Asaphidae, *Asaphus homfrayi,* pl. 1, fig. 10; *A. crofftii,* pl. 1, fig. 11, Longmynd.

Asaphus tyrranus, pl. 2, fig. 38, Arenig.

Asaphus powisii, pl. 3, fig. 59, Caradoc.

Genus *Ogygia buchii,* pl. 2, fig. 39, Llandeilo.

Ogygia selwynii, pl. 1, fig. 21, Tremadoc.

Fam. 11. Illaenidae, *Illaenus davisii,* pl. 3, fig. 58, Caradoc.

Illaenus nexilis, pl. 10, fig. 261; *I. insignis,* pl. 10, fig. 262; *I. barriensis,* pl. 10, fig. 268, Wenlock

Illaenus perovalis, pl. 2, fig. 36, Arenig.

Illaenus bowmani, pl. 5, fig. 110; *I. thompsoni,* pl. 5, fig. 112, Llandovery.

Fam. 12. Aeglinidae, *Aeglina binodosa,* pl. 1, fig. 20, Tremadoc.

Aeglina mirabilis, pl. 2, fig. 37, Arenig.

Fam. 13. Cheiruridae, *Cheirurus bimucronatus,* pl. 6. fig. 113, Llandovery.

Cheirurus sedgwicki, pl. 2, fig. 41, Arenig.

Genus *Sphaerexochus mirus,* pl. 10, fig. 254-256, Wenlock.

Fam. 14. Encrinuridae, *Encrinurus punctatus,* pl. 6, fig. 114, 115, Llandovery.

Encrinurus variolaris, pl. 10, fig. 253, Wenlock.

Genus *Cybele verrucosa,* pl. 3, fig. 60, Caradoc.

Fam. 15. Agnostidae, *Agnostus dux,* Longmynd.

Agnostus mccoyi, pl. 2, fig. 31, Arenig.

Lichapyge cuspidata, pl. 1, fig. 12, Longmynd.

Conophrys salopiensis pl. 1, fig. 8, Longmynd, (referred to *Shumardia*).

Ostracoda:

Genus *Leperditia gracilenta,* pl. 22, fig. 801-804.

Genus *Beyrichia complicata,* pl. 3, fig. 54, Caradoc.
Beyrichia kloedeni, pl. 10, fig. 238, Wenlock.

Eurypteridae, *Eurypterus acuminatus,* pl. 17, fig. 558, Ludlow.
Eurypterus lincaris, pl. 17, fig. 559; *E. megalops,* pl. 17, fig. 560; *E. brodici,* pl. 17, fig. 566; *E. pygmaeus,* pl. 17, fig. 557; *E. symondsii,* pl 17, fig. 561.

Pterygotus ludensis, pl. 17, fig. 567, Ludlow.

Pterygotus problematicus, pl. 17, fig. 588; *Pterygotus,* pl. 21, fig. 823.

LA TOUCHE, J. D.—Continued.

Stylonurus.

Suborder Xiphosurus.

Hemiaspis limuloides, pl. 17, fig. 569-570; *H. salweyi,* pl. 22, fig. 807; *H. limuloides optatus,* pl. 17, fig. 569, Ludlow.

Phyllopoda.

Hymenocaris.

The carapace which covers the fore part of the body is not apparently bivalved, and is somewhat triangular. There are nine segments of the body and the last bears three spiked appendages, setae.

Ceratiocaris pardoensis, pl. 17, fig. 563, Ludlow.

Ceratiocaris sp., pl. 17, fig. 564; *C. murchisoni,* pl. 17, fig. 565; *C. leptodactylus,* pl. 17, fig. 566; *C. (Physocaris) vesica,* pl. 22, fig. 816.

LAURIE, M. A Reconstruction Trilobite.—Nature, Vol. 38, p. 26.

LERICHE, M. La Faune du Gedinnien, Interieure de l'Ardenne.—Mém. Mus. Roy. Hist. Nat. Belg., Vol. 6, 1912, pp. 1-58, figs. 1-3.

Ostracoda:

Primitia jonesi De Koninck, p. 42, pl. 3, figs. 4-6.

Beyrichia kloedeni McCoy; *B. sp.,* p. 44, pl. 3, fig. 8.

Ordre des Trilobites:

Homalonotus roemeri De Koninck, p. 45, pl. 3, figs. 10-12.

Acaste downingiae Murch., p. 47, pl. 3, figs. 8, 9, fig. 4 in text.

LERICHE, M. See GOSSELET, J. A. A.

LIEBER, HUGO. Beiträge zur Geol. eds Reinberggebietes bei Marburg.—Palaeont. Abschnitt, überarbeitet durch E. Huffner, 1917, pp. 98, plates 12.

Trilobita:

Proetus (aff.) dormitans Richt., p. 54; *P. eremita* Barr., p. 55, pl. 6, fig. 6; *P. waldschmidti* Novak, p. 55, pl. 6, fig. 4; *P. sp.*

Phaetonellus planicauda Barr., p. 56.

Tropidocoryphe filicostata Novak, p. 56, pl. 8, fig. 10.

Cyphaspis hydrocephala A. Roem., p. 57.

Phacops fecundus major Barr., p. 57, pl. 8, fig. 7; *P. breviceps* Barr., p. 58, pl. 7, figs. 1, 1b.

Harpes sp., p. 58, pl. 6, fig. 7.

Acidaspis pigra Barr., p. 59, pl. 6, fig. 5; *A. hoernesi* Barr., p. 59, pl. 8, fig. 9.

Bronteus dormitzeri Barr., p. 60, pl. 6, fig. 8; *B. granulatus* Goldf., p. 60, fig. 2.

Thysanopeltis speciosus Corda, p. 60, pl. 8, fig. 8.

LOCZY, VON L. Beschreibung d. foss. Säugethier, Trilobiten und Mollusken-Reste u. d. Palaeont. Stratigraph.—Resultate d. Graften B. Széchenyi en Ostasien. Bidazy, 1898, 11 plates, 22 figures.

LUDWIG, RUDOLPH. *Dithyrocaris* aus dem Rheinischen Devon-Gebirge.—Palaeontogr., Bd. XI, pp. 309-310, pl. 50.

Dithyrocaris kochi sp. nov.; *D. breviaculeata* sp. nov.

——— Devonischen Versteinerungen von Lagoinha in Matto Grosso, Brasil.—Zeitschr. d. Ges. für Erdkunde zu Berlin, Vol. 38, pp. 1-15.

MAILLEUX, EUGENE. Quelques Notes sur les Trilobites du Couvinien des Environs de Couvin.—Proc. Verb. Soc. Belge de Géologie, Tome XVII, p. 579.

The author gives a list of the Trilobites of the Devonian of Couvin with figures and description of a new species, *Proetus barroisi.* This species has been referred to the genus *Tropidocoryphe* by Rud. & E. Richter, 1919, p. 26, fig. 2, a figure of an entire specimen.

———— Note sur l'Hypostome de *l'Homalonotus rhenanus* Koch.—Bull. Soc. Belge de Géol., Tome XXV, 1911, p. 113, fig. in text.

The author figures the hypostoma of *Homalonotus rhenanus* after Beuhausen's fig. 6 from Oberstadtfeld. This form differs from that from Mormont in having a much wider, more limited and flatter shape, and in other minor differences. The fig. 2 of the Mormont hypostoma exhibits a forked form characteristic of that of *Homalonotus dekayi.*

———— Sur deux Pygidia du *Bronteus flabellifer* Goldfuss.—Bull. Soc. Géol. Brux., Tome XXI, 1908, p. 255.

———— Quelques Remarques sur la Faune du Hundsrücken Inférieure du Bassin du Luxembourg.—Bull. Soc. Belge de Géol., Tome XXVIII, 1914, pp. 77-79.

In addition to the list of Devonian Trilobites, the author notes the presence of *Lichas* and *Bronteus in the Hundsrückien* lower beds of Longlier.

M. Asselbergs's list included *Homalonotus planus* (Juseret), *H. ornatus* (Martelange), *H.* cf. *multicostatus* (Warmifontaine), *H. armatus?* (Royvaux), *Phacops ferdinandi?* (Warmifontaine), *Dalmania* (*Odontochile*) cf. *spinifera* (Martelange), *Cryphoeus drevermanni* (Royvaux), Proetus dispersus (Juseret).

———— Remarques sur la Faune Trilobitique de l'Assise des Schistes et Calcaires à *Calceola sandalina* du Bord-Sud du Bassin de Dinant.—Bull. Soc. Belge de Géol., Tome XXIX, 1919, pp. 52-55.

Gives a list of the Trilobites of the Devonian of this Basin.

———— The Palaeozoic Formation of the Southern Part of the Dinant Basin.

List of Trilobites.

Ordovician Schistes de Mondrepuits.

Acaste downingiae; Homalonotus roemeri.

Devonian Siegenian (corresponds approximately to the Siegenerschichten of the Rhine).

Homalonotus crassicauda; Asteropyge laciniatus.

Assise de Hauffalize (Hundsrückian).

Homalonotus sp.; *Asteropyge laciniatus.*

Emsian (Coblenzschichten of the Rhine).

Assise de Vireux (Lower Coblenzschichten).

Homalonotus cf. *planus; H. rhenanus.*

Assise de Hierges (Two horizons).

Homalonotus, Lower beds.

Homalonotus; Asteropyge laciniatus; Upper beds.

Eifelian or Middle Devonian.

Couvinian.

Assise du Bure.

Phacops schlotheimi; Acidaspis radiata; Lichas armatus; Asteropyge punctatus.

Assise de Couvin.

MAILLEUX, EUGENE.—Continued.

Phacops latifrons; P. schlotheimi; Asteropyge punctatus; Goldius flabellifer; Proetus holzapfeli; P. cuvieri; Acidaspis radiata; Eudechenella verneuili; Ceratarges armatus; Cyphaspis hydrocephala; Tropidocoryphe barroisi.

Givetian.

Phacops latifrons; Eudechenella verneuili.

Assise de Frasnes.

Asteropyge sp.; *Cyphaspis* sp.

———— Présence du *Tropidocoryphe barroisi* dans le Couvinien supérieure des Environs de Hotton.—Bull. Soc. Belge de Géol., de Palaeont, &c., Vol. 31, 1921, pp. 22-23.

MANSUY, H. Fascicule II, Etude Géologique du Yun-Nan Oriental.—Part 2, Palaeontologie, 1912.

Cambrian.

Ostracoda:

Bradoria douvillei sp. nov., p. 22, pl. 1, fig. 3; *Aluta?*, p. 22, pl. 4, fig. 7; *N. orthozoe?* p. 23, pl. 4, fig. 8.

Trilobita:

Redlichia chinensis Walcott, p. 24, pl. 1, fig. 10a, b; pl. 2, fig. 1a-j; pl. 3, fig. 1a, b; *R. nobilis* Walcott, p. 26, pl. 3, fig. 2; *R. walcotti* sp. nov., p. 26, pl. 3, fig. 4a-h; *R. carinata* sp. nov., p. 27, pl. 3, fig. 5a-f; R. sp.-p. 27, pl. 4, fig. 5.

Palaeolenus gen. nov., p. 27.

The genus is allied to *Olenus* by the general form, by the direction of the facial sutures, and by the number of thoracic segments; but it is separated by the rectangular form of the glabella and its dilated from in front.

Bathyuriscus armatus Walcott has a similar glabella.

Palaeolenus douvillei sp. nov., genotype, p. 29, pl. 3, fig. 6a-d; pl. 4, fig. 1a-d; *P. lantenoisi* sp. nov., p. 29, pl. 4, fig. 2a-e; *P. deprati* sp. nov., p. 30, pl. 4, fig. 1a, b.

Ptychoparia yunnanensis sp. nov., p. 31, pl. 4, fig. 4a, b.

Merostoma:

Amiella prisca sp. nov., p. 31, pl. 4, fig. 6.

Silurian.

Malacostraca:

Ceratocaris pierloti sp. nov. p. 36, pl. 6, fig. 1a, b.

Sinocaris gen. nov., p. 36.

Sinocaris asiatica sp. nov., p. 37, pl. 5, fig. 10a, b, *S. barbagei* sp. nov., p. 37, pl. 5, fig. 11.

Trilobita:

Dionide formosa Barr., p. 37, pl. 6, fig. 2a, b.

Ostracoda:

Cythere sp.? p. 40, pl. 6, fig. 6.

Carboniferous, p. 85.

Proetus ellipticus sp nov., p. 85, pl. 16, fig. 2a-c.

This *Proetus* is characterized by a marked narrowing in the posterior part and by the angulated form of the glabella, narrow in front; in this it approaches slightly certain forms of Dechenella. The Pygidium of the new species has a more *Proetus* form.

———— Résultats de la Mission Géologique et Minière du Yunnan mèridional. Résultats paléontologiques.—Ann. des Mines, Mars, Avril, 1907, p. 155.

Olenellus (*Mesonacis*) *verneaui* sp. nov., from Lou-Fong-Ts'ouen et d'Yi-Léang.

An incomplete specimen referred to this genus because of its affinities with the American form *O. asaphoides* Emmons.

MARR, J. E. The Lower Palaeozoic Rocks of the Gautley District, (Yorkshire).—Abs. Proc. Geol. Soc., 1912-13, p. 14.—Quart. Jour. Geol. Soc., Vol. 69, 1913, pp. 1-17.

List of Palaeozoic Crustacea, not descriptive.

MATHER, KIRTLEY F. See WILSON, ALICE E.

MCLEARN, F. H. Revision of Some Phacopid Genera.—Ottawa Naturalist, Vol. 22, 1918, pp. 31-36.

In this monograph on the fauna of the Silurian Arisaig series, the author has found it necessary to revise the interpretation of several Phacopid genera, for the definitions now used are not considered to be in accordance with the evolution of the Trilobite family; *Dalmanitina* Reed, *Phacopidella* Reed, and *Phacops* Emmrich, are redefined.

The equivalence of *Acaste* Goldfuss and *Acaste* Salter are interpreted to replace these genera by *Dalmanitina* and, in particular, Salter's use of *Acaste*.

Describes a new variety, *Dalmanitina logani conservatrix*.

Portlockia McCoy is revised and emended, with subgeneric rank, for the ancestors of the Devonian *Phacops*, sensu stricto.

The generic name *Glockeria* Wedekind is found to be untenable.

Phacopina Clarke is not considered to be a true Phacopinid and is placed in the subfamily Dalmanitinae.

The author used *Galymene stokesii* Milne Edwards for the genotype of the subgenus *Portlockia*, including *Tril. elegans* Sars, *Phacops orestes* Billings, and a new species, *Phacops* (*Portlockia*) *marlandensis*.

The Silurian group of *Phacops stokesii* is ancestral to the group of *Phacops latifrons* from the Devonian, and differs from the latter by having the glabella more depressed anteriorly, so as not to overhang the anterior margin.

———— The Silurian Arisaig Series of Arisaig, Nova Scotia.—Am. Jour. Sci., Vol. 45, 1918, pp. 126-140.

Mentions *Calymene intermedia antigonishensis*, var. nov.

Dalmanitina logani conservatrix var. nov.

This variety described in Ottawa Naturalist, May, 1918, p. 31.

MIQUEL, J. Essai sur le Cambrian de la Montagne Noire.—Bull. Soc. Géol. France, Ser. 4, 1905, pp. 465-483, figs. tin text, pl. XV.

MITCHELL, JOHN. The Carboniferous Trilobites of Australia.—Proc. Linn. Soc. N. S. Wales, Vol. 43, Part 3, Aug. 28, 1918, pp. 437-494, plates 46-53.

The author gives a critical review of the Carboniferous Trilobites of Australia previously described by McCoy, De Koninck, Reed & Etheridge, jr., 1847-1917.

Brachymetopus strzelecki McCoy, 1847.

Phillipsia eichwaldi DeKon., (non Fischer).

Under the name *Griffithides* (*Phillipsia*) *eichwaldi*, de Koninck described a trilobite from Colo Colo, New South Wales.

Mitchell referred it to *G. convexicaudatus*.

Phillippsia dubia Etheridge, Jr. (non *Griffithides dubius* Etheridge, Sr.), Geol & Pal. Queensland and New Guinea, 1892, p. 214-5, pl. 8, fig. 5; pl. 44, fig. 4, Mitchell (pl. 44, fig. 4.) refers to *Phillipsia rockhamptonensis*, and, (pl. 8, fig. 5,) to *Phillipsia stanvellensis*.

Griffithides dubius Etheridge, Sr., Quart. Jour. Geol. Soc., Vol. 28, 1872, p. 338, pl. 18, fig. 7.

MITCHELL, JOHN.—Continued.

In the possession of ten or more segments in the thorax it resembles *G. sweeti* and, certainly in this respect, is not a normal *Griffithides* or *Phillipsia.*

Phillipsia grandis Etheridge, jr., Geol. & Pal. Queensland and New Guinea, 1892, p. 215.

Geol. Sur. N. S. Wales, Pal., no. 5, pt. 2, 1892, text fig. 5, pl. 21, fig. 5.

Geol. Sur. Queensland, Publication no. 260, pp. 11, 12, pl. 3, fig. 3.

It is unfortunate that Etheridge placed these two forms specifically together. They are quite different and described by Mitchell as *Phillipsia? robusta* sp. nov. (Etheridge's text fig. 5,) and *Phillipsia grandis,* (Etheridge's pl. 21, fig. 5).

The name *"grandis"* is quite appropriate for either of the forms, because their pygidia are larger than those of any other known form of Carboniferous Trilobite.

Phillipsia woodwardi Etheridge, Geol. & Pal. Queensland & New Guinea, 1892, p. 215, pl. 6, fig. 11, 13; pl. 14, figs. 5, 6.

Other *Phillipsia* without a name were described by Etheridge in Mem. Geol. Sur. N. S. Wales, Pal., 1892, from fragments of the pygidia.

Griffithides dubius Etheridge, Sr., Quart. Jour. Geol. Soc., Vol. 28, 1872, p. 38, pl. 18, fig. 7; *Griffithides seminiferus* De Koninck, (non Phillips).

If De Koninck's figures are to be relied upon, which is doubtful, as they do not agree with the text, (in the former the glabella is represented as being conical in outline and, in the latter, it is said to have an anterior width slightly less than its base). Whatever *Phillipsia* (*Griffithides*) *seminifera* De Koninck may have been, it is practically certain that it was not *Griffithides seminiferus.* Mitchell comparies it with *G. collinsi,* especially the pygidium.

Griffithides seminiferus australasica Etheridge, Geol. & Pal. Queensland & New Guinea, 1892, p. 216, pl. 7, fig. 14.

The species possesses supplementary lobes and *G. seminiferous* does not. Mitchell refers the pygidia to *Phillipsia woodwardi.*

Griffithides sweeti Etheridge, Proc. Linn. Soc. N. S. Wales, 1894, p. 528, pl. 39,fig. 3.

Mitchell remarks "It seems to me that a new genus or subgenus will be needed for this trilobite with ten thoracic segments."

The following species are described and illustrated in this work:

Phillipsia collinsi sp. nov.; *P. coulteri* sp. nov.; *P. breviceps* sp. nov.; *P. proxima* sp. nov.; *P.? robusta* sp. nov.; *P.? stroudensis* sp. nov.; *P. superba* sp. nov.; *P.? waterhousei* sp. nov.; *P. elongata* sp. nov.; *P. rockhamptonensis* sp. nov.; *P. stanvellensis* sp. nov.; *P. grandis* Eth. jr.; *P. woodwardi* Eth. jr.; *P. morganensis* sp. nov.; *P. connolli* sp. nov.; *P. rouchelensis* sp. nov.; *P. dungogensis* sp. nov.

Griffithides convexicaudatus sp. nov.; *G. sweeti* Eth. jr.; *G. dubius* Eth. Sr.

Brachymetopus strzeleckii McCoy; *B. dunstani* sp. nov.; *B.* sp. indet.

———— On Two New Trilobites from Bowning.—Proc. Linn. Soc. N. S. Wales, Vol. 44, 1919, Pt. 2, Aug. 27, 1919, pp. 441-449, pl. 15, 16.

Dalmanites (*Hausmannia*) *loomisi* sp. nov. and *D. meridianus* E. & M.

For *Hausmannia meridianus* Etheridge & Mitchell (in part), 1895.

The author remarks "It appears that the generic name *Hausmannia* proposed by Etheridge & Mitchell, (Proc. Linn. Soc. N. S. Wales, Vol. 10, 1895, p. 502.) to take the place of *Dalmanites* Barr., and which had been previously suggested for a subgenus of *Dalmanites* by Hall & Clarke, (Pal. N. Y., Vol. 7, 1888,) has been rejected by pataeontologists, and for this rejection I am willing to admit there is very good reason, if there were no other than that *Dalmanites* has been so long in use and generally accepted."

Phacops crossleii E. & M.; *Ph. serratus* E. & M.

Adastocephalum telectypicum gen. nov. et sp. nov.

This new genus belonging to the family Phacopidae has the following generic characters:

Glabella subquadrate, mildly rounded in front, sides straight, only gently converging to the neck ring; lateral glabellar furrows and lobes absent.

The outstanding features of this new type are the complete absence of glabellar furrows and lobes, the small convergence of the axial furrows posteriorly, the squat condition of the eyes, and the mild convexity of the cephalon.

MITCHELL, JOHN. See also ETHERIDGE, R.

MOBERG, JOH. CHR. Historical-Stratigraphical Review of the Silurian of Sweden.—Sveriges Geol. Undersökning, Ser. C, No. 229, 1911, pp. 210, Geol. Map.

Chapter 11 gives a general review of the different series.

Series C, Gotlandia.

The Gotlandian of Skäne.

Zones 4-1 Oved-Ramsäda formation.

3. *Colonus beds,* Zone with *Gothograptus nussa* Holm,—Odarslof flags.

2. *Cytograptus* beds, Zones *C. carruthersi,* etc.

1. *Rastrites* beds, Zones *Monograptus runcinatus* Lapw., *Diplograptus coneta* Gein., etc.

The Gotlandian of Gotland, C/2.

9. Hard Limestone, Crinoid Limestone or Stromatopora Limestone.
8. Ostracod Limestone.
7. *Girvanella* Limestone.
6. Oolite.
5. Sandstone.
4. *Girvanella* Marl.
3. *Dayia* Limestone with *D. navicula* Sow.
2. Marl Shales with Limestone bands, containing *Graptolites.*
1. Shales with *Stricklandiana lirata* Sow.

The Gotlandian of Jämtland, C/3.

3. *Rastrites* beds, upper part.
2. Pentamerus Limestone.
1. Quartzite with *Phacops elliptifrons* Esm.

The Gotlandian of Dalarne, C/4.

4. Grind-sandstone.
3. *Bumastus* Limestone, Grey Shale, *Colonus* beds.
2. *Retiolites* beds.
1. *Rastrites* beds.

Series B, Ordovician.

5. *Harpes* Regio.
4. *Trinucleus* Regio.
3. *Chasmops* Regio.
2. *Asaphus* Regio.
1. *Ceratopyge* Regio.

Series A, Cambrian.

3. Upper Cambrian Zones, *Acerocare, Peltura, Eurycare, Parabolina spinulosa* or *Orthis lenticularis* zone; *Olenus* and *Agnostus* Zones.

2. Middle Cambrian Zones, *Forchammeri* beds, *Agnostus laevigatus* and *Centropleura lovéni* Zones; *Paradoxides davidis* Zone; *Tessini* beds; Middle *Tessini* layers and *Conocoryphe exsulans* Zone; *Oelandicus* beds (*Par. oelandicus* Zone).

1. Lower Cambrian, *Holmia kjerulfi* Zone or Fucoid Sandstone; *Schmidtiellus torelli* Zone,—*Mickwitzia* or *Eophyton;* Lower Hardeberga Standstone.

Mordziol, C. Ueber *Agnostus pisiformis*. Centralbl. für Mineral., 1908, pp. 535-540.

Morgan, J. Mission scientifique en Perse. Part 4, Palaeontologie, Fossiles, par H. Douville, 1904, pp. 187-380, figs., plates 25-50.

Morningstar, Helen. Pottsville Fauna of Ohio.—Geol. Sur. of Ohio, Fourth Series, Bulletin 25, 1922.

Crustacea:

Phillipsia sangamonensis Meek & Worthen, 1865, p. 272.

Compares the pygidia with *P. missouriensis* and *P. major*.

The species *P. sangamonensis* has the same number of axial rings (18) with eleven pairs of pleurae on the lateral lobes.

Phillipsia trinucleata Herrick, 1887, p. 274.

Several pygidia from the Sharon ore are here referred to this species, but they differ from Herrick's species in the absence of the minute granules on the surface.

Nebe, Balduin. Die Culmfauna von Hagen i. W.; ein Beitrag zur Kenntniss des Westfälischen Untercarbons.—Neues Jahrib. für Min. Geol. and Palaeont. Beilage, Bd. XXXI, 1911, pp. 431-495, plates XII-XVI.

Trilobita:

Phillipsia westphalica sp. nov., p. 474, pl. XII, figs. 1-5; *P.* cf. *eichwaldi* Fischer, p. 476, pl. XII, fig. 6; *P. sp.*, p. 478. All from Producten-Bank, the new species ranging to Grauerkalk.

Novak, Ottomar, and Perner, Jaroslav. Trilobiti Pasna, D-/ly.—Palaeontographica Bohemiae Nr. IX, Prage. 1918, pp. 51, plate 4.

These notes by Novák are published as a Memori to O. Novák in two sections, Polish and German.

The following forms of fossil Crustacea are described and figured:

Agnostus accedens Novák, p. 6, pl. IV, figs. 32, 33; *A. bohemicus* Nov., p. 6, pl. 1, fig. 7; *A. perrugatus* Barr., p. 7; *A. tullbergi* Nov., p. 7.

Aeglina bergeroni Nov., p. 7, pl. IV, figs. 34-37, fig. in text; *A. prisca* Barr., p. 8; *A. speciosa* Corda, p. 8.

Areia barrandei Nov., p. 8, pl. I, fig. 1-3.

Acidaspis buchi Barrande, p. 8.

Barrandia bohemica Nov., p. 9, pl. IV, figs. 23-31, text fig. 2.

Calymene (*Synhomalonotus*) arago Rouault, p. 10, pl. IV, fig. 20-22; *C.* (*Synhomalonotus*) *inopinta* Nov., p. 10, pl. IV, figs. 1-6; *C.* (*Pharostoma*) *pulchra* Barr., p. 12, pl. IV, figs. 17-19.

Cheirurus pater Barr., p. 12.

Dalmania barroisi Nov., p. 12, pl. I, figs. 8-10; *D. atava* Barr., p. 13.

In the environs of Prague *Dalmania atava* is represented by a number of variants from the typical form. It is remarkable that these varieties constitute a series characterized by the progress in the number of facets of the eye.

The varieties pass to *Dalmanites oriens* and Dr. Perner estimates that the difference between the two species is not of sufficient importance to maintain *D. oriens* as a distinct species.

Varieties of *Dalmania atava;*

A. var. *microphthalma*, Nov., p. 14, pl. I, fig. 13; B. var.*intermedio* Nov., p. 14, pl. I, figs. 11, 12, 14, text fig. 3; C. var. *atava* Barr., type, p. 15; D. var. *transiens* Nov., p. 15, pl. I, fig. 15; E. var. *macrophthalma* Nov., p. 15, pl. I, fig. 16.

Dalmanites oriens Barr., p. 16.

Dicellocephalina bohemica Nov., p. 17, pl. I, figs. 4-6, text figs. a-c. The form approaches *Centropleura dicranura* Ang. in the form of the cephalon.

Dindymene bohemica Barr., p. 20.

Illaenus aratus Nov., p. 20, pl. II, figs. 27, 28; *Ill. parabolinus* Nov., p. 20, pl. II, figs. 1-9; *Ill. sarkaensis* Nov., p. 21, pl. II, figs. 10-14; *Ill. katzeri* Barr., p. 22, pl. III, figs. 19-22.

Placoparia zippei Boeck, p. 22.

Pliomera senilis Barr., p. 23.

Ptychocheilus (*Niobe*) *discretus* Barr., p. 23, pl. III, figs. 1, 2.

Megalaspides alienus Barr., p. 24, pl. III, figs. 9-18.

Asaphellus desideratus, Barr., p. 25, Pl. III, figs. 4-8, text fig. 5.

Trinucleus (*Cryptolithus*) *reussi* Barr., p. 25.

PAECKELMANN, —. Oberdevon des Bergischen Badens.—Abhandl. Kgl. Preuss. Geol. Landesanst., N. F., 70, 1913.

PERNER, JAROSLAV. See NOVAK, O.

PFEIL, —. Zeitschr. d. Deutsch. Geol. Ges., Vol. 34, 1882, p. 49.

POMPECKJ, J. F. Ueber *Euloma* und *Pharostoma*.—Neues Jahrb. für Min., 1900-1, pp. 135-138.

POST, L. VON. Bibrag. till Kännedomen von *Ceratopyge* Regionens Utbildning inom Falbygden.—Geol. Fören. Stockh. Förhandl., 28, 1906, pp. 465-480, figs. pl. 13.—Sver. Geol. Undersökn. afh., Ser. C, No. 208, 1906, pp. 1-18, figs. plates.

Not descriptive. The author figures the following species:

Niobe obsoleta Linrs., pl. 13, figs. 1, 2; *Harpides rugosus* Sars & Boeck, pl. 15, figs. 3-5; Pygidium of *Ceratopyge,* pl. 15, figs. 6, 7.

PRICE, W. ARMSTRONG. Palaeontology of Nicholas County, West Virginia, p. 786.

Griffithides scitulus Meek.

Described from the casts of two pygidia. Axis with 8-10 rings; lateral lobes with 6 to 7 pairs of pleurae. Kanawha Group, Eagle Shales.

PRUVOST, P. Sur un *Dalmania* du Devonien Inférieure des Pyrénées.—Ann. Soc. Géol. Nord., Vol. 39, 1911, pp. 2-6, pl. 1.

———— Sur la Presence du Genre *Arthropleura* dans le Terrain Houiller du Nord, et du Pas-de-Calais.—Ann. Soc. Géol. Nord., Vol. 12, 1912, pp. 57-64.

———— Découverte de *Leaia* dans le Terrain Houiller du Nord, et du Pas-de-Calais. Observations sur le Genre *Leaia* et ses différentes Espèces.—Ann. Soc. Géol. Nord. Vol. 43, 1920, pp. 254-281, figs. pl. 2.

———— Introduction à l'Etude du Terrain Houiller du Nord et du Pas-de-Calais. La Faune Continentale du Terrain Houiller du Nord de la France.—Mémoires pour servir à l'Explication de la Carte Géologique détaillée de la France, 1919, p. 334.

The author mentions an almost complete specimen found at Levant du Flénu which he referred with doubt to *Euproops* (*Prestwichia* pro-parte) *danae* Meek & Worthen.

RAW, P. The Development of *Olenus salteri* Callaway.—Rep. Brit. Assoc. Adv. Sci., Leicester, 1907.

RAYMOND, PERCY E. A New *Ceraurus* from the Chazy.—New York State Mus. Bull. 189, 1916, p. 121, pl. 30, figs. 9-12.

———— The Presence of a Median Eye in Trilobites.—The Same, pp. 127-143, plates 34-36, text figs. 40-42.

———— The Cephalic Suture Lines of *Cryptolithus*.—The Same, pp. 144-148, text figs. 43-46.

———— Note on Parallelism among the Asaphidae.—Trans. Roy. Soc. Canada, Vol. 5, 1912, Section IV.

Add to the reference of this work in Bibliography Palaeozoic Crustacea, 1895-1917, Transactions San Diego Society of Natural History, Vol. III, No. 1, pp. 73-75:

New Genus *Homoglossa*.

For *Ogygia dilatata panderi* Schmidt, as a genotype.

The type has a long glabella with glabellar furrows at the sides, a distinct, but smooth axial lobe on the pygidium, and smooth pleural lobes; evidently not an ogygiocaris.

————The Succession of Faunas at Lévis, P. Q.—Am. Jour. Sci., Vol. 38, 1914, pp. 523-530.

Divides the fauna into zones A to D.

Places *Arionellus subclavatus* Billings and *Caryocaris curvatus* Gurley in Zone C/1; *Isotelus* sp. in Zone C/2; *Agnostus orion* Bill., *A. sidenbladhi* Linrs., *Shumardia granulosa* Bill., *S. pusilla* Sars, *S.* sp., *Endymionia meeki* Bill., *Holometopus angelini* Bill., *Triarthrus* sp. indet., and an Ostracod in Zone D/1.

———— The Pygidium of the Trilobite.—Geol. Mag., Vol. 57, 1920, p. 22.

The author remarks that the development of the pygidium in Trilobites, both as to morphology and ontogeny, shows that the large pygidium is primitive and the small one specialized.

———— On some new Ordovician Trilobites.—Bull. Mus. Comp. Zool., Vol. 64, No. 2, 1920, pp. 273-296.

Dr. Raymond proposes six new genera and describes the following species:

Cryptolithus acervulosus sp. nov. (Described under *Trinucleus*).

Dionideidae, fam. nov.; *Dionide holdoni* sp. nov.

This species is more like *D. richardsoni* Reed than any other. It has fewer rings and ribs on the pygidium, a wider cephalon and narrower axial lobe. The ornamentation separates it from all other species.

Dionide contrita sp. nov.

Raphorus powelli sp. nov.

Endymionidae fam. nov.; *Endymionia meeki* Bill.; *E. schucherti* sp. nov.

Anisonotus glacialis gen. nov.; *A. horneii* (N. & E.); *A. obtusus* M. & S.

Cephalon irregularly convex; glabella small, with lateral furrows indicated by pits; axial lobes of thorax narrow; thorax 7 segments. Pygidium semicircular, but having a somewhat triangular appearance, as in the pygidia of *Cryptolithus* and *Ampyx*, with an axis of 9 rings; sides with 9 pairs of furrows and flat ribs.

Triarthrus caecigenus sp. nov.

Robergia major sp. nov.

This species is exceedingly abundant in the Athens of Saltvile, Va. It differs but little from R. *schlotheimi*.

Styginidae fam. nov.; *Stygina latifrons* (Portl.)

Bronteopsis gregaria sp. nov.

Nileoides gen. nov.; *Nileus perkinsi* Raymond.

Hybospis shuleri gen. nov. et sp. nov.

The name is proposed for a curious trilobite in the pygidium of which are combined the elongate form of the Asaphid and the short axial lobe of the Illaenid.

Homotelus gen. nov.

The *Onchometopus* of Raymond and Narraway, not Schmidt.

The cephala of American and Russian forms are exceedingly alike in the smoothness of the glabella, position of the eyes, course of the facial sutures and shape of the fixed and free cheeks. Doublures are strikingly different, not only in the hooked and furrowed character of the Russian forms, but also in its narrowness. Greater differences are seen in the thorax where *Onchometopus* shows the high narrow rings of an *Asaphus*, while *Homotelus* has the broader and flattened rings of *Isotelus*. The pygidia are similar.

Homotelus ulrichi sp. nov., genotype; *H. elongatus* sp. nov.; *H. indentus* sp. nov.; *H. laevis* sp. nov.; *H. laeviurus* sp. nov.; *H.* catactus sp. nov.; *H. gratiosus* sp. nov., the *Asaphus* (*Isotelus*) *susae* Whiteaves, not Whitfield.

Vogdesia gigas sp. nov.

The author remarks on this genus: Although proposed as a subgenus of *Nileus, Vogdesia* proves to be one of the Asaphinae, and closely related to *Homotelus* and *Brachyaspis*. This conclusion has been reached from a study of the dorsal surface, as the hypostoma has not been seen. *Vogdesia* differs from both of the genera mentioned in having a wider axial lobe in the thorax, and little or no trace of dorsal furrows on the pygidium.

Referred to the genus:

Vogdesia bearsi Raym., genotype; *V. minnesotensis* (Foerste) and *Nileus* sp. Foerste from the renTton; *V. vigilans* (Meek & Worthen), Maquoketa group.

Ectenaspis gen. nov., genotype *Megalaspis beckeri* (Slocum) ; *E. Homalonotoides* (Walcott).

Isotelus rejuvenis sp. nov.

Ectenonotus gen. nov.; *E. westoni* (Billings) ; *E. octocostatus* (Reed).

————Phylogeny of the Arthropoda, with Especial Reference to the Trilobites.—Am. Naturalist, Vol. 54, 1920.

Summary:—It would appear that the Trilobites, particularly in respect to their appendages, are more primitive than any other Arthropoda. The chief modifications in other groups are in the nature of reduction, in the loss of whole appendages, of branches or of segments. Extra segments are sometimes added to certain appendages, and new outgrowths, epipodites, are common among the Crustacea.

The Trilobites have what seems, at first sight, a peculiar and specialized dorsal test, but now that it has been shown that the pleural lobes may be lost and the pygidium reduced to a single segment, and, chiefly, that the wormlike form is not primitive, but secondary, they may be viewed in an entirely new light, &c.

————A Contribution to the Description of the Fauna of the Trenton Group.—Canada Dept. of Mines Geol. Sur., Mus. Bulletin, No. 31, 1921, pp. 42, plates 11.

The following Trilobites are described and figured:

Eoharpes ottawaensis (Bill.) ; *E. dentoni* (Bill.)

Remopleurides striatulus Walc.

Bathyurus ingalli Raym.

Hemiarges paulianus (Clarke).

Encrinurus cybeleformis sp. nov.

Raymond, Percy E.—Continued.

Cybele spicata sp. nov.

Ceraurus dentatus Raym. & Barton.

Ceraurinus marginatus Barton.

Calymene sp. indet..; *C. senaria* Conrad.

Pterygometopus achates (Billings).

————The Appendages, Anatomy and Relationship of Trilobites.—Mem. Conn. Acad. of Arts & Sci., Vol. 7, 1920, pp. 169, plates 11, figs. in text 46.

Part 1. The appendages and description, with illustration of *Neolenus serratus* Rominger; *Nathorstia transitans* Walc.; *Isotelus latus* Raym.; *I. maximus* Locke; *I. gigas* De Kay; *I. arcuicola* Raym.; *Triarthrus becki* Green; *Ptychoparia striata* (Emm.); *P. cordillerae* (Rominger); *P. permulta* Walc.; *Kootenia dawsoni* Walc.; *Calymene senaria* Conr.; *Ceraurus pleurexanthemus* Green; *Acidaspis trentonensis* Hall; *Cryptolithus tessellatus* Green.

Part 2. Structure and Habits of Trilobites.

Internal organs and muscles.

Alimentary canal:—*Ceraurus pleurexanthemus, Calymene senaria* Conrad, *Cryptolithus goldfussi.*

Gastric glands.

Heart:—*Illaenus, Ceraurus* and *Calymene.*

Nervous system, various glands, Panderian organs, eyes, sex, eggs.

Part 3. Relationship of the Trilobites to other Arthropoda.

Branchiopa.

Burgessia bella, Waptia fieldensis, Yohoia tenuis, Opabina regalis.

Copepoda, Archiopepoda, Ostracoda, Cirripedia, Malacostraca, Phyllocardia, Syncarida, Isopoda.

Marrella splendens restored.

Arachnida; Trilobites not Arachnida.

Merostomata.

Sidneyia inexpectans; Emeraldella brocki; Molaria and *Habelia.*

Primitive characteristics of Trilobites; limbs of Trilobites; number of segments in the trunk; form of the simplest protaspis; origin of the pygidium, &c.

————Criteria for Species; Phylogenies and Fauna of Trilobites.—Bull. Geo. Soc. of America, Vol. 52, 1921, pp. 349-352.

Characteristics of the body.

The division transversely into cephalon, thorax and pygidium is subject to much more variation, and the relative lengths of the three portions are frequently used in separating species.

Characteristics of the cephalon.

Of great value in classification. Since the time of Salter and Barrande the major characteristics used in classification have been those of the cephalon, but it remained for Beecher to show the value of the facial sutures and so put in logical order the families already in use.

Characteristics of the ventral side and pygidium.

The ventral side of the body has never, so far, been used in discriminating species.

The extent and form of the doublure has in a few cases afforded generic distinctions.

The shape of the epistoma is, in many cases, of family value, and the hypostoma often enables one to recognize the genus or, if not that, a family.

The pygidium is more used in making specific distinctions than any other part of the body.

In smooth Trilobites the proportion of length to breadth is almost always constant in small groups. Correlated with this is the number of segments, which is seldom fixed and may, or may not be of specific value.

The rings of the axis represent the true number of segments in the shield, and there are usually less ribs on the pleural than rings on the axial lobe. The number of ribs, their length, prominence, furrows, and ornamentation is of specific value.

The width of the border, the spines on the margin, &c., may be of generic importance.

————The *Ceratopyge* Fauna in Western North America.—Am. Jour. Sci., Ser. 5, Vol. 5, 1921, pp. 204-210.

In the Eureka District, Nevada, the faunas of the lower part of the Pogonip are but imperfectly known, yet there is evidence of the *Ceratopyge* zone in the appearance of *Symphysurus eurekensis, Apatokephalus finalis, Ceratopyge goldfussi,* and *Hemigyraspis caribouensis.* Raymond remarks that *Ptychoparia* (*Euloma*) *affinis* is, however, probably not an Euloma.

In Utah, in the House Range, the highest formation of the Upper Cambrian is named the Notch Peak. No fossils were found in place, but a drift boulder, supposed to have derived from strata in the upper 640 feet, contains *Agraulos sp., Solenopleura ? sp.* and *Tsinania cleora* Walcott. Raymond referred the last named species to *Symphysurus.* The type of *Tsinania,* a Chinese species, has a cranidium similar to that of *Symphysurus,* but more nearly hemispherical, and a pygidium which is nearly as long as wide. This latter feature is the most distinguishing one for the genus and is not shared by any American form.

In British Columbia, two miles west of Donald Station, Prof. Daly found two trilobites, *Dikelocephalus? dalyi* and *Tsinania elongata.* The latter is a *Symphysurus.* This faunule is of the *Ceratopyge* zone. From a lower portion of it, ten miles southeast of Leanchiol, Walcott describes a new species, *Ceratopyge canadensis,* with doubtful reference to this genus. The Canadian form has no glabellar furrows and differs in the course of the facial sutures.

Raymond, in a footnote, describes a new species, *Megalaspis shepardi,* known only from the pygidium, which is elongate in form, subtriangular, pointed behind; axis not prominent, contracted near the middle, with about six joints; pleurae nearly smooth, with one pair of obscure ribs; shell strongly punctate.

Symphysurus, a characteristic fossil of the *Ceratopyge* fauna, with the Brachiopods *Syntrophia mundina* and *Eoorthis desmopleura,* would seem to show that the *Ceratopyge* fauna occupies a position at the base of the Ordovician, from Robson Peak in Canada, southward to the Eureka District in Nevada, on the Western side of the Rocky Mountains.

————A Trilobite Retaining Color Markings.—Am. Jour. Sci., Fifth Series, Vol. 4, 1922, pp. 461-464, Fig. in text.

Anomocare vittata sp. nov.

The author describes and figures a pygidium of *Anomocare vittata* from the Cambrian of Cherokee County, Alabama, which exhibited not very conspicuous banding. The surface is covered with transverse stripes of light and dark gray, the latter almost black. At the anterior margin is a narrow, light band, followed by the broadest one of all, quite dark in tone. The two remaining pairs of dark bands are much narrower, the last almost in line with a continuation of the dorsal furrows. The first two pairs cross the axial lobe, but as all turn backward, they have a somewhat radial effect. In addition to the bands there are very small, irregularly placed spots of a yellowish hue.

REED, F. R. COWPER. The Structure of *Turrilepas peachi* and its Allies.—Trans. Roy. Soc. Edinburgh, Vol. XLVI, Part 3, No. 21, 1908, one plate.

Turrilepas peachi, p. 519, pl. 1.

The author figures one nearly complete individual, pl. 1, fig. 1, from the

REED, F. R. COWPER.—Continued.

Starfish bed, with plates in position, and it closely resembles the form described and figured by Barrande as *Plumulites folliculum* from Stage D/d2.

The general structure of the fossil casts doubt on the view that *Plumulites* Barrande and *Turrilepas* Woodward (type *T. wrighti*) are synonymous.

———The Devonian Faunas of the Northern Shan States.—Palaeontologia Indica, New Series, Vol. 2, Memoir, No. 5, 1908, plates I-XX.

Crustacea:

Phacops latifrons (Bronn), var., p. 132, pl. XVII, figs. 15-25.

The author follows Kayser's limiting of the species to Bronn's large form with a non-protruding glabella, which occurs in the *Stringocephalus* Limestone, and separates off the smaller, widely distributed Devonian form with a projecting glabella, as *P. schlotheimi* (Bronn), in accordance with Bronn's original descriptions.

Asteropyge.

Dr. Reed, under the subgenus *Dalmanites* Barrande, 1852, placed, under a section of the genus, Corda's *Asteropyge* to replace the preoccupied term *Cryphaeus* Green, 1837, used Klug in 1833 for a genus of Coleoptera.

The author states that the separation of *D. stellifer* from *D. arachnoides* as the type of a distinct genus, named by Corda *Metacanthus,* is artificial, being based merely on the presence or absence of a terminal median spine to the pygidium.

Kayser, Die Fauna Dev., Ablag. Harzez, Bd. 2, Heft 4, 1878, p. 33, attached specific importance to this feature and even, on the strength of it, would revive Corda's dual division of *Asteropyge* and *Metacanthus.*

Phacops (*Dalmanites*) cf. *Stellifer* Burm., p. 136, pl. XVII, figs. 26, 26a; *Ph.* (*Dalmanites*) *punctatus* (Steininger), p. 137, pl. XVII, figs. 22, 28.

Phaetonides aff. cyclurus Hall, p. 177, pl. XX, fig. 20.

The generic position of this trilobite seems to be in *Phaetonides,* rather than in *Brachymetopus,* although such species as *B. strzeleckii* and *B. woodwardi* bear a considerable resemblance in the shape of the cheek.

Phyllocarida:

Echinocaris asiatica sp. nov., p. 179, pl. XX, figs. 21-25.

The species bears a considerable resemblance to *E. punctata* Hall, but the ornamentation of the test, and the tuberculation of the longitudinal ridge are different from the Wetwin form.

———Pre-Carboniferous Life Provinces.—Rec. Geol. Sur. of India, Vol. XL. Part 1, 1910.

Paper on the problems of the geographical distributions of life in the Palaeozoic seas.

———Devonian Fossils from Chitral, Persia, Afghanistan, and the Himalayas.—Rec. Geol. Sur. of India, Vol. XLI, Part 2, 1911.

Crustacea:

Proetus chilralenis sp. nov., p. 38, pl. 7, fig. 1-6, from Chitral.

The species is allied to *P. bohemicus* Corda, but differs by the posterior half of the pleurae of the pygidium being more swollen, and by the border of the cephalon being concentrically striated above, as well as laterally and below, &c.

———Silurian Fossils from Kashmir.—Rec. Geol. Sur. of India, Vol. XLII, Part 1, 1912.

Crustacea:

Acidaspis kashmirica sp. nov., p. 18, pl. 9, fig. 1-3.

The pygidium has a great resemblance to *A. deflexa* Lake, particularly in the development of the marginal spines, but the tubercles at their bases sufficiently mark off the Kashmir species.

Calymene cf. *blumenbachii* Brong., p. 20, pl. 9, figs. 4, 5.
Illaenus aff. macallumi Salter.
Encrinurus cf.*punctatus,* p. 22.

————Carboniferous Fossils from Siam.—Geol. Mag., Vol. LVII, 1920, pp. 113-178, pl. 2.

Proetus cf. *coddonensis* Woodward, p. 174, pl. 2, fig. 17.
Phillipsia aff. silesiaca Scupin, p. 175, pl. 2, fig. 18.

————Lower Palaeozoic Fossils, Shan States.—Pal. India, Ser. Nov., Vol. 2, No. 3, 1906, pp. 154, Plates 8.

————Himalayan Fossils; Ordovician and Silurian Fossils from the Central Himalayas.—Mem. Geol. Sur. India, Palaeontologia Indica, Ser. XV, Vol. 7, Mem. No. 2, 1912.

Crustacea:

Asaphus emodi Salter.

The author remarks that if the pygidium is taken in conjunction with any of the associated cephala and pleurae, it can scarcely be doubted that it may be referred to etiher the genus *Asaphus* or *Ptychopyge.*

Asaphus emodi milanensis var. nov.; *Asaphus sp.;* three sp. indet.

Illaenus brachyoniscus Salter; *Ill. punctulosus* Salter; *Ill. spitiensis* sp. nov.; *Illaenus sp.*

Bronteus aff. *lunatus* Billings.

Lichas (Amphilichas) tibetanus Salter; *Lichas sp.*

Calymene nivalis S. & B.

Sphaerexochus idiotes Salter.

Cheirurus mitis Salter, *Ch. sp. Ch. (Cyrtometopus) sp.*

Pliomera cf. *insangensis* Reed.

Prosopiscus minus Salter.

Ostracoda:

Eurychilina monticuloides sp. nov.

Krausella shianensis sp. nov.

Primitia everesti sp. nov.

Primitia gerardi sp. nov.

Leperditella? himalaica sp. nov.

Crustacea.

Lankpya lekhi Pass.

Encrinurus aff. *punctatus* Brünnich.

Calymene sp.?

————The Lower Palaeozoic Trilobites of Girvan. Supplement.—Palaeontological Society, 1913, London, Feb. 1914, pp. 56, plates 8.

Trinucleidae:

Trinucleus albidus sp. nov., p. 3, pl. 1, fig. 1, 2.

Ampyx macconochei E. & N.

Dionide richardsoni Reed, p. 5, pl. 1, fig. 7.

Harpedidae:

Harpes (Eoharpes) youngi sp. nov., p. 6, pl. 1, fig. 4-6; *H. (Eoharpes) flannagani* Portl. p. 9, pl. 1, fig. 7-9; *H. (Eoharpes) hornei* sp. nov., p. 10, pl. 2, fig. 1, 2.

Olenidae:

Remopleurides nicholsoni sp. nov., p. 12, pl. 2, fig, 3.9; *R. correctus* Reed, p. 15, pl. 2, fig. 10.

Reed, F. R. Cowper.—Continued.

The author remarks that there seems to be more than a superficial resemblance between the genus *Remopleurides* and *Apatokephalus*, the presence of the pre-glabellar area on the cephalon of the latter, and absence of deflection in the tongue of the glabella seeming to be the principal points of distinction. The glabella, eyes and free cheeks of such a species as *Apatokephalus pecten* Wiman show many features of similarity to *R. correctus, R. barrandei, R. bicornis* and other species.

There seems to be reason to believe that the pre-glabellar area has only been much reduced in *Remopleurides*. The peculiar position of the genal spine in *A. pecten* is identical with that of *R. bicornis*. If we compare *A. serratus* (Boeck) and *S. schlotheimi* (Billings) with the above-mentioned species of *Remopleurides*, we shall see further points of resemblance; and even when we look at the pygidium we can see how, in the reduced number of axial segments in *A. pecten* and in the presence of only three pairs of pleural points, a greater approach is made to the condition in *R. colbyi, R. laterispinifer* and other species.

Telephus salteri sp. nov., p. 16, pl. 2, fig. 11.

Asaphidae:

Asaphus (*Isotelus*) *grayae* sp. nov., p. 16, pl. 3, fig. 1-6.

Stygina latifrons Portl., p. 18, pl. 3, fig. 7.

Cyclopyge bumasti sp. nov., p. 19, pl. 3, fig. 8; *C. subarmata* sp. nov.., p. 20, pl. 3, fig. 9-12.

Bohemilla scotica sp. nov., p. 22, pl. 4, fig. 1.

Illaenus latus McCoy, p. 23; *Ill. peachi* sp. nov., p. 24, fig. 2, 3; *Ill. portlocki* Salter, p. 25; *Ill. richardsoni*, p. 25, pl. 4, fig. 4, 5.

Bronteidae:

Bronteopsis scotica Salter, p. 26, pl. 4, fig. 6.

Proetidae:

Cyphaspis jamesoni sp. nov., p. 27, pl. 4, fig. 8.

Lichadidae:

Lichas (*Corydocephalus*) *maccullochi* sp. nov., p. 28, pl. 4, fig. 9, 10; *L.* (*Amphilichas*) *ardmillanensis* sp. nov., p. 29, pl. 5, fig. 1; *L.* (*Amphilichas*) *hibernicus Port.*, p. 30, pl. 5, fig. 2.

Acidaspidae:

Acidaspis asteroidea sp. nov., p. 31, pl. 5, fig. 3-7; *A. girvanesis* sp. nov., p. 33, pl. 5, fig. 8-10; pl. 6, fig. 1-3; *A playfairi* sp. nov., p. 35, pl. 6, fig. 4-6; *A. terribilis* sp. nov., p. 36, pl. 6 fig. 7-10.

Encrinuridae:

Encrinurus contentus sp. nov., p. 39, pl. 6, fig. 11, 12. *E. multisegmentatus trispinosus* var. nov., p. 39, pl. 7, fig. 1-3.

Cybele lovéni girvanensis Reed, p. 40, pl. 7, fig. 4, 5; *C. bellatula balclatchiensis* var. nov., p. 41, pl. 7, fig. 6; *C. michelli* sp. nov., p. 42, pl. 7, fig. 7.

Dindymene cordai Eth., jr., & Nicholson, p. 44, pl. 7, fig. 8, 9.

Cheiruridae:

Cheirurus keisleyensis Reed, p. 45, pl. 8, fig. 1; *C. octolobatus* McCoy, p. 46.

Sphaerexochus mirus Beyr., *balclatchiensis* var. nov., p. 47, pl. 8, fig. 2.

Staurocephalus globiceps (Port.) p. 48, pl. 8, fig. 3.

Phacopidae:

Phacops (*Chasmops*) *bisseti* Reed, p. 48, pl. 8, fig. 4; *P.* (*Pteryometopus*) *retardatus* sp. nov., p. 49, pl. 8, fig. 5-7; *P.* (*Pterygometopus*) *hunteri* sp. nov., p. 52, pl. 8, fig. 8, 9; *P.* (*Dalmanitina?*) *asterovideus* sp. nov., p. 53, pl. 8, fig. 10.12.

———The Genus *Homalonotus*.—Geol. Mag., Decade VI, Vol. 5, 1918, pp. 263-276 & 314-327.

The species of *Homalonotus* are grouped together into ten sections or subgenera on the strength of the character and course of the facial sutures, the development of the epistome and doublure, the degree of trilobation of the thorax, and the shape, trilobation, and segmentation of the pygidium.

These characters are variously combined, but on the whole, two large divisions may be recognized, so far as the pygidial characters alone are concerned, one of which is marked by rounded and the other by pointed pygidia.

In the Ordovician genera the pygidia are short, rounded, and composed of few segments, and the trilobation is well marked. In the Silurian and most of the Devonian species the pointed, elongated pygidium, composed of many segments, with or without distinct trilobation, is found conspicuously developed. In the Devonian some of the species with rounded pygidia again prevail, but there is a larger number of segments, and the trilobation is more or less lost.

Ordovician Subgenera:

1. *Echomalonotus* Reed, (for *Brongniartia* pars Salter, not Leach or Eaton).

Cephalon transverse, rounded, more or less semicircular. Facial sutures uniting close to the anterior margin, or on the margin in a regular, wide curve, and posterior branch cutting lateral margins slightly in front of genal angles.

Pre-glabellar area wide, presutural band very narrow or wanting. Thorax with well marked trilobation; axis not wider than the pleural portions.

Pygidium short, broad, expanded, composed of few segments, 6-8; axis distinct; plurae continued to edge or nearly to it; doublure vertical or steeply inclined at sides, simple, of nearly uniform width all round or narrowing slightly posteriorly.

Genotype *H. brongniarti* (Desl.). Range: Lower Ordovician. Distribution: Northern France, Cornwall, Shropshire, Bohemia, thirteen species.

There is a close connection between *Echomalonotus* and *Synhomalonotus* through which the genus is related to *Calymene*.

Ordovician:

2. *Calymenella* Bergeron: Genotype *C. boisseli* (Bergeron).

Cephalon triangular, produced in front into a rostrum; facial sutures uniting in front in regular continuous curve at base of rostrum and inside margin.

Pygidium semicircular, transverse, composed of few segments, distinctly trilobed; axis and pleurae well marked.

Distribution: France, two species.

Middle and Upper Ordovician.

3. *Brongniartella* Reed, (*Brongniartia* pars Salter): Genotype *Homalonotus bisulcatus* Salter.

Cephalon rounded, semielliptical or semicircular, wider than long; facial sutures uniting close to the anterior margin, or on the margin, in a regular, wide curve, the posterior branches cutting the lateral margins nearly at the genal angles.

Glabella urceolate, rhomboidal, or subconical, generally lobeless. Pre-glagellar area of moderate width, presutural band very narrow or wanting.

Thorax with trilobation more or less indistinct; axis wider than plural portions.

Pygidium rounded, semioval or parabolic, composed of 9-12 segments; axis distinct, pleurae continued nearly to margin, border usually developed, but not defined.

Doublure flat, horizontal, closely infolded, of nearly uniform width.

Distribution: England, five species.

Silurian.

4. *Trimerus* Green: Genotype *H. delphinocephalus* Green.

Cephalon triangular and elongated; facial sutures uniting anteriorly close to, but inside, margin in a more or less pointed arch, not forming a continuous,

REED, F. R. COWPER.—Continued.

regular curve, the posterior branches cutting the genal angles; pre-glabellar area well developed; glabella subconical, occasionally lobed.

Thorax, thirteen segments, with very broad axis and indistinct trilobation.

Pygidium composed of many segments, triangular, elongated, subcylindrical, ending in a produced acumination; trilobation faint; doublure very narrow at sides, widening at tip.

Distribution: Northern Europe, North America, Australia, four species.

Silurian.

5. *Koenigia* Salter: Genotype *H. knighti* Koenig.

Cephalon transverse, broad, short; epistome projecting in front as median process; anterior lateral angles of cephalon angulated forward, the three together making the margin tricuspid; facial sutures bending suddenly inward near the anterior margin and uniting in a straight or concave, transverse commissure with small median point; posterior branches of facial sutures bending back suddenly to cut the lateral margins nearly at the genal angles; pre-glabellar area very narrow.

Thorax trilobation almost obsolete; axis very broad, scarcely defined.

Pygidium composed of many segments, elongated, acuminate, triangular, with smooth, pointed posterior process; axis nearly obsolete, but segmentation of axis and pleurae distinct; doublure widening posteriorly.

Distribution: Northern Europe, two species.

A highly specialized subgenus. It is doubtful if *H. johannis* can be closely associated with it, in spite of its tricuspid front, as the pre-glabellar portion is different.

Lower Devonian.

6. *Burmeisteria* Salter (sens. rest.); Genotype *H. herschelii* (Murchison).

Cephalon triangular; facial sutures convergent anteriorly, uniting by a double sigmoidal commissure close to front margin, and posteriorly cutting lateral margins in front of genal angles.

Pre-glabellar area well developed; paraglabellar area distinct; glabella occasionally lobed; epistome projecting in front of anterior margin of cephalon as median pointed process; presutural area very narrow.

Thorax with wide, ill-defined axis; trilobation indistinct.

Pygidium triangular, acuminate, strongly convex from side to side, composed of many segments; axis and pleurae more or less distinct.

Test of cephalon, thorax and pygidium frequently ornamented with more or less regularly disposed, large tubercles or spines.

Distribution: Southern Hemisphere, Africa and South America, nine species.

Lower Devonian.

7. *Digonus* Gürich: Genotype *H. gigas* Roemer.

Cephalon transverse or subtriangular; cranidium with anterior lateral angles rectangular, obtuse, or projecting, and with the anterior margin truncate, straight, or slightly concave; facial sutures bent in abruptly near front margin, and uniting in a continuous, transverse commissure; pre-glabellar area well developed; glabella short, subquadrate or oblong.

Thorax with trilobation usually distinct and well marked.

Pygidium triangular, elongate, acuminate, more or less pointed behind, composed of many segments; trilobation generally well marked. Test of whole body occasionally scabrous or tuberculated but not spinose.

Distribution: France(?), Rhenish Area, England(?), Argentina, seven species.

Lower Devonian.

8. *Burmeisterella* Reed: Genotype *H. elongatus* Salter.

Cephalon subtriangular, produced anteriorly into upturned prora, formed by the epistome and bounded by the epistomal sutures; presutural area large;

facial sutures bent in abruptly in front and uniting by a transverse commissure close to the anterior end of the glabella; pre-glabellar area narrow.

Thorax with well defined cylindrical axis of less width than pleural portions; trilobation distinct.

Pygidium semioval, rounded, with regular entire margin, in one species provided with a pair of short, terminal spines. (Reed desscribed this species, *B. bifurcata* sp. nov., in Geol. Mag., 1920, p. 303, fig. in text.).

Axis narrow, elongated, distinct, composed of many segments; pleurae distinct; test of glabella, thorax and pygidial axis ornamented with regularly disposed pairs of large tubercles or spines.

Distribution: Devonshire, Rhenish Area, five species.

Lower Devonian.

9. *Parahomalonotus* Reed: Genotype *H. gervillei* Drever.

Cephalon semicircular, transverse; facial sutures uniting in a regular, wide-arched commissure, close to anterior margin.

Thorax with axis obsolete and trilobation quite lost.

Pygidium rounded, semicircular, or suboval, with entire margin; trilobation more or less indistinct, but segmentation well marked, border not crossed by pleurae; test surface ornamented with coarse tubercles and granules, or smooth.

Distribution: Europe, eight species.

Middle Devonian.

10. *Dipleura* Green: Genotype *H. dekayi* Green.

Cephalon subtriangular, with large presutural prora; facial sutures uniting in front of the glabella by a straight, transverse commissure, but continued directly forward without deviation into the epistomal sutures bounding the prora.

Thorax with faint trilobation.

Pygidium triangular, subconical, obtusely pointed behind, with trilobation obsolete or obsolescent, and segmentation very faintly marked.

Distribution: North America.

Devonian.

Schizopyge Clarke, 1913: Genotype *H. longicaudatus.*

Clarke suggested this name for a pygidium with a series of marginal spinules and long terminal spine.

Clarke (Foss. Dev. do Paraná, 1920, p. 101.) remarks that the Paraná and Turkish pygidia would prove to represent a genus distinct from *Homalonotus* or *Calymene,* but allied to both.

————Ordovician and Silurian Fossils from Yun-nan.—Palaeontologia Indica, New. Ser., Vol. 6, Memoir 3, pp. 55-69, plates 8, 1917.

The following species are described and illustrated:

Harpes aff. spasskii Eichwald.

Remopleurides aff. latus Olin.

Asaphus aff. expansus Linné.

Ogygites yunnanensis sp. nov.

Illaenus cacoides sp. nov.; *Ill. aff. oblongatus* Ang.; *Ill. aff. schmidti* Nieszkokski; *Ill.* cf. *tauricornis* Kutorga; *Ill. aff. punctulosus* Salter.

Nilus armadillo Dalman; *N. sp.*

Bathyurus mansuyi sp. nov.

Lichas (*Metopolichas*) *celorhin* cf. *coniceps* Leucht; *L.* (*Metopolichas*) *aff. verrucosus* Eichd.

Calymene unicornis sp. nov.; *C. sp.*

Pliomera martellii sp. nov.

REED, F. R. COWPER.—Continued.

————Notes on the Fauna of the Lower Devonian Beds of Torquay, Part 1.—Geol. Mag., Vol. 57, 1920, pp. 299-306, & pp. 341-347, plate IV.

Homalonotus (*Digonus*) *gonipygaeus* Woodward; *H.* (*Burmeisterella*) *bifurcatus,* fig. in text exhibiting the short, bifurcated spinose process on the pygidium; *H.* (*Burmeisterella*) *champernownei* Woodward; *H.* (*Burmeisterella*) *elongatus* Salter; *H.* (*Burmeisterella*) *armatus* Burmeister; *H.* (*Burmeisterella*) sp.; *H.* (*Parahomalonotus*) *whidbornei* sp. nov.

Dalmanites (*Asteropyge*) *laciniatus* (Roemer).

Beyrichia (*Zygobeyrichia*) *devonica* J. & W.

————The Lower Palaeozoic Trilobites of Girvan.—Palaeontographical Soc., 1913, Supplement, pp. 56, pl. 5.

The species described are as follows:

Trinucleus albidus sp. nov., for *Trinucleus* sp. b.

Ampyx macconochiei (E. & N.), for *Trinucleus macconochiei* E. &. N.

Remidopleurides nicholsoni sp. nov., for *R. colbyi.*

Dionide richardsoni Reed.

Harpes (*Eoharpes*) *youngi* sp. nov.; *H.* (*Eoharpes*) *flanagani* Portl.; *H.* (*Eoharpes*) *hornei* sp. nov.

Remidopleurus correctus Reed.

Telephus salteri sp. nov.

Asaphus (*Isotelus*) *grayae* sp. nov., for *Asaphus* (*Isotelus*) *gigas.*

Stygina latifrons Portl.

Cyclopyge bumasti sp. nov.; *C. subarmata* sp. nov.

Bohemilla scotica sp. nov., for *Bohemilla* sp.

Illaenus latus McCoy; *Ill. peachi* sp. nov.; *Ill. portlocki* Salter; *Ill. richardsoni* sp. nov.

Brontcopsis scotica Salter; *B. ardmillanensis* Reed.

Cyphaspis jamessoni sp. nov.

Lichas (*Corydocephalus*) *maccullochi* sp. nov.; *L.* (*Amphilichas*) *ardmillanensis* sp. nov.; *L.* (*Amphilichas*) *hibernicus* Portlock.

Acidaspis asteroidea sp. nov.; *A. girvanensis* sp. nov.; *A. playfairi* sp. nov.; *A. terribilis* sp. nov.

Encrinurus contentus sp. nov.; *E. multisegmentatus trispinosus* var. nov.

Cybele lovéni girvanensis Reed; *C. bellatula balclatchiensis* var. nov.; *C. michelli* sp. nov.

Dindymene cordai E. & N.

Cheirurus keisleyensis Reed; *C. octolobatus* McCoy.

Sphaerexochus mirus balclatchiensis var. nov.

Staurocephalus globiceps (Portlock).

Phacops (*Chasmops*) *bisseti* Reed; *P.* (*Pterygometopus*) *retardatus* sp. nov.; *P.* (*Pterygometopus*) *hunteri* sp. nov.; *P.* (*Dalmanites?*) *asteroideus* sp. nov.

————Supplementary Memoir on New Ordovician and Silurian Fossils from the Northern Shan States.—Mem. Geo. Sur. India, Palaeontologia Indica, Vol. 6, Mem. No. 1, 1915.

Crustacea:

Agnostus cf. *glabratus* Ang.

Ampyx rostratus shamensis var. nov.; *A. aff. maccallumi* Salter.

Dionide hybrida sp. nov.

Harpes (*Eoharpes*) *aff. flanagani* Portl.

Remopleurides sp.

Asaphus cf. *devexus* Eichw.; *A.* cf. *ornatus* Pomp.

Ogygites birmanicus sp. nov.

Ptychopyge thebawi sp. nov.; *P. sp.; P.* (*Basilicus*) *titanica* sp. nov.

Megalaspis aff. hyorhina Leuch.; *M. sp.*

Illaenus liluensis sp. nov.; *Ill.* sp.; *Ill. aff. portlocki* Salter.

Holometopus wimani sp. nov.; *H. orientalis* sp. nov.

Lichas (*Metopolichas*) *aff. verrucosus* Eichw.; *L. sp.,* 1-3.

Calymene birmanica Reed; *C.* (*Pharostoma*) *liluensis* sp. nov.; *C. oldhami* sp. nov.

Cheirurus dravidicus sp. nov.; *C. submitis* sp. nov.

Pliomera (*Encrinurella*) *ingsangensis* Reed.

Encrinurella.

The new subgenus given for this species on the difference in the shape and lobation of the glabella from *Pliomera.*

Glabella large, claviform, or subpyriform, expanding anteriorly to about one and a half times its basal width, swollen, convex, slightly overhanging the anterior margin; three pairs of nodular lateral lobes present, front one large, rounded anteriorly, more than one-third the length of the glabella.

First lateral lobes small, subcircular, nodular, one-fifth the width of glabella; second lateral lobes smaller, nodular, nearly circumstribed internally; third lateral lobes still smaller, nodular, connected by a narrow band across base of glabella; surface of glabella granulated.

Phacops (*Pterygometopus*) *dagon* sp. nov.; *P.* (*Pterygometopus*) *dagon wynnei* var. nov.; *P.* (*Chasmops?*) sp.; *P.* sp. indet.

Ostracoda:

Aparchites? sp.; *Primitia aff. mundula* Jones; *Krausella* sp.

Fossils from the Silurian Beds.

Crustacea.—Fauna of the Namhsim Beds.

Illaenus namhsimensis sp. nov.; *Calymene blumenbachii* Brong., var.; *Phacops* (*Dalmanites*) *longicaudatus orientalis* Reed.

Panghsa-pye Beds, (Trilobite band).

Acidaspis shanensis sp. nov.; *Phacops* (*Dalmanites*) *hastingsi* sp. nov.

Ostracoda:

Bollia alexanderi sp. nov.; *Kloedenella? birmanica* sp. nov.; *Primitiella? orientalis* sp. nov.

Reed, F. R. Cowper, & Reynolds, S. H. Silurian Fossils from Certain Localities in the Tortworth Inlier.—Proc. Bristol Nat. Sci., Ser. 4, Vol 2, 1908, Part 1.

List of Fossils.

————Fossiliferous Silurian Rocks of the Tortworth Inlier.—Quart. Jour. Geol. Soc., Vol. 44, 1908, pp. 512-545.

List of Fossils.

Reed, F. R. Cowper, & Gardiner, G. I. The Silurian Inlier of Usk.—Proc. Cotteswod Nat. F. C., Vol. XIX, Pt. 2, 1916, pp. 129-172, pl. 78.

Crustacea:

Proetus stokesi bellula var. nov., p. 165, pl. 8, fig. 5-11.

The cephalon closely resembles that of specimens usually referred to *Proetus stokesi,* but the original description is scanty, the figure of this species is poor and the genotype specimen is not known.

McCoy's description was unsatisfactory and Lovén was the first to give a full diagnosis of the specific characters with good figures.

The Usk cephalia differ from the Wenlock examples by the relatively shorter and blunter glabella, the stronger development of the first and second glabel-

Reed, F. R. Cowper and Gardiner, G. I.—Continued.

lar furrows, and larger eyes. The median ridge in the marginal furrow in front of the glabella, which is present in the new variety, and in some specimens from the Wenlock Limestone of Dudley, is not mentioned by McCoy or Lovén, nor is it shown in any of the figures of *P. stokesi.* The species is said by Lovén to have a double elevated line on the cheek, whereas in var. *bellula* the line is single.

Proetus signatus Lindström, p. 168, pl. 8, fig. 12.

Calymene intermedia Lindström, p. 168.

Phacops (*Phacopidella*) *stokesi uskensis* var. nov., p. 169, pl. 8, fig. 13-16.

This small form may be regarded as more nearly allied to *P. stokesi* than to *P. elegans* Sars & Boeck. The two much reduced and isolated lateral furrows on the glabella, the long, frontal lobe and strong third lateral furrow recall also *P. misheni.* The division of the first lateral furrow into two parts is always a marked feature in the two first named species, but the greater distinctness of the subcircular composite lateral lobe in the new variety seems to mark it off from typical *P. stokesi,* and to warrant its separation as a definite variety.

Reck, Hans. See Staff, Hans von.

Reynolds, S. H. See Gardiner, G. I.

Reynolds, S. H. See Reed, F. R. Cowper.

Richter, E. See Ritcher, Rudolf.

Richter, Rudolf. Von unseren Trilobiten.—Bericht. der Senckenbergischen Nat. Ges. in Frankfort am Main, 1914, pp. 50-62, 22 figures.

Agnostus rex Barr.

Trinucleus ornatus Sternb.

Drepanura premesnilli Berg.

Conocoryphe sulzeri Schlot.

Agnostus pisiformis Linné.

Dalmanites socialis Barr.

Calymene niagarensis Hall; *C. blumenbachii* (Brong.) Salter.

The upper and under side of a Trilobite.

Harpes naummanni Barr.; *H. ungula* Sternb.

Dechenella granulata Richter.

————Die Entstehung der abgeroliten "Daleider Versteinerungen" und das Alter ihrer Mutterschichten.—Jahrb. der Königl. Preuss. Geol. Landesanstalt für 1916, Bd. 37, Heft & pp. 247-259, pl. 25-27.

Cryphaeus rotundifrons Emm.; *C. kochi* Kayser; *C. letheae* Kayser.

Acaste henni Richter; *A. schmidti* Richter.

Cryphaeus anserinus Rud. & E. Richter; *C. drevermanni* Rtchter; *C. stellifer* Burm.; *C. punctatus* Stein.

———— Proetiden aus neueren Aufsammlungen im Vogtländischen und Sudetischen Oberdevon.—Senckenbergiana, Bd. 1, No. 4, 1919, pp. 97-130, 14 figs. in text.

Cyrtosymbole planilimbata sp. nov.; *C.* sp. nov. a; *S. sp.* nov. b. & c.

Drevermannia aff. brocciae Ritcher; *D. sp.* c; *D. ?carnica macilenta* var. nov.

Typhloproetus schidewolfi sp. nov.

Skemmatopyge gen. nov.: Genotype *S. tietzei* sp. nov.

Proetus (*Chaunoproetus*) subgen. nov.; *Proetus* (*Chaunoproetus*) *palensis* Richter, 1913; *Proetus* (*Chaunoproetus*) ex. *aff. palensis* sp. nov a.

Heiloproetus subgen. nov.: Genotype *Proetus* (*Heiloproetus*) *ebersdorfensis* Richter; *P.* (*Heiloproetus*) *oblongulus* sp. nov.

Proetidae, subgenera incerta.

Proetus (Subg.?) *gümbeli* Richter, 1913, & var. *abruptirachis; P.* (Subg?) *franconicus* sp. nov.; *P.* (Subg?) *avitus* sp. nov.; *P.* (Subg?) sp. indet.

————Vom Bau und Leben der Trilobiten. 1. Das Schwimmen.—Senckenbergiana, Bd. 1, No. 6, 1919, pp. 32-38, 8 figs. in text.

————Vom Bau und Leben der Trilobiten. 2. Der Aufentenhalt auf dem Boden, Der Schutz, Die Ernährung.—Senckenbergiana, Bd. 2, Heft 1, 1920, pp. 23-43, 12 figs. in text.

———Beiträge zur Kenntniss Devonischer Trilobiten. Dritter Beitrag ueber die Organisation von Harpes, einen Sonderfall unter Crustaceen, 1920.—Senckenbergischen Nat. Ges., Bd. 37, 1917, pp. 179-218, plates.

Harpes macrocephalus Goldfuss.

RICHTER, RUDOLF, & RICHTER, E. Die Lichadiden des Eifler Devons.—Nues Jahrb. für Min., etc., Jahrg., Bd. 1, 1917, pp. 50-72, pl. 5, 6, 12 figs. in text.

Lichas (ex *aff. Plusiarges?*) *beryllifer* Richt.; *Lichas* (*Euarges*) cf. *parvulus* Novák; *Lichas* (*Ceralarges*) *armatus* Goldf.; *Lichas* (*Eifliarges*) *caudimirus* sp. nov. et subg. nov.

Eifliarges subg. nov.; Genotype *Lichas* (*Eifliarges*) *caudimirus.*

Wir errichten für diese affällige und nirgends unterzubringende Form eine neu Untergattung, *Eiflarges,* die in folgender Weise gekennzeichnet werden kann. Kopf nach den Grundplan von *Euarges* gebaut, d. h., vordere Seitenlappen ringsherum scharf umgrenzt, hintere Seiten lappen nach vorn, innen und hinten scharf umgrenzt, nach aussen abermit den Festen Wangen verschmolzen. Nackenläppchen fehlen. Wangenhörner nach vorne gerückt-Schwanz mit Argesgesetz und Rippen (nur aus den wulstigen Hinter bändern der Glieder bestehend), aber aus zahlreichen (8) Gliedern aufgebaut und mit fast ebensovielen (7) enggestellten und über die ganze Flanken fläche gleichmässig verteilten Rippen versehen, die sich in Stacheln fortsetzen-Höhere Lagen des unteren Mitteldevons. Einzige Art. *L.* (*Eifliarges*) *caudimirus* sp. nov.

————Bemerkungen ueber das Schnauzenschild bei Homalonoten.—Centralblatt für Min., etc., Jahrg., 1917, No. 5, pp. 114-120, 3 figs. in text.

Rostral shields of *Homalonotus rhenanus* Kock; *H.* (*Burmeisteria*) *armatus; H. noticus* Clarke.

The Acidaspidae consist of nine genera and six subgenera with about 107 species described from the Ordovician, Silurian and Devonian.

The six subgenera are arranged as follows:

a.—*Acidaspis* (*Pseudomonaspis*) *grayi* Barr.: Genotype.
(*Primaspis*) *primordalis* Barr.: Genotype.

b.—*Odontopleura* (*Leonaspis*) *leonhardi*: Genotype.

c.—*Ceratocephala* (*Miraspis*) *mira* Barr.: Genotype.
(*Radiaspis*) *radiata* Goldf.: Genotype.
(*Ceratocephala*) *goniata* Warder.

The original term *Acidaspis* Murchison, 1839, was founded on a group corresponding to *Odontocephala ovata* Emmons, 1839.

The original and earlier term *Ceratocephala* Warder, 1832, was founded on a group of species like *Acidaspis verneuili* Barr.

The occipital ring exhibits different characteristics:

1.—In *Odontopleura ovata* it has a median tubercle; thorax 9 segments; pleurae ending in double points; pygidium border spined, 3-p-4-p-3. Silurian.

Richter, Rudolf and Richter, E.—Continued.

2.—Occipital ring with a pair of occipital spines originating on each side, *Ceratocephala goniata,* Silurian. A similar species from Bohemia, *C. verneuili* Barr. has ten thorax segments; pleurae ending in a point; pygidium axis two joints; border with seven pairs of spines.

3.—Occipital ring with a long median spine and median tubercle, *Acidaspis brighti,* Silurian. Thorax not known; pygidium border 2-p-3-3.

4.—Occipital ring with a median tubercle and a pair of lateral spines, like *Odontopleura* and *Ceratocephala,* but the posterior border with six small spines; thorax 10 segments; pleurae ending in double points; pygidium axis two joints, border spined 3-p-5-p-2. *Acidaspis (Primaspis) primordialis* Barr., Ordovician.

5.—*Selenopeltis buchi,* occipital ring entire, without spines, Ordovician. Throax nine segments; pleurae ending in spine and point; pygidium axis two joints; border entire except the first rib extending over the margin. O-p-O-p-O.

6.—*Dicranurus hamata,* occipital ring with two spirally recurved spines; thorax axis very abruptly elevated, semicylindrical, with two lateral tubercles; pleurae extending at right angles to the axis and bent backward into long spines; pygidium border, O-p-O-p-O. Devonian.

7.—*Ancyropyge romingeri,* Devonian, only known from the pygidium, which has twelve long, curved spines, 4-p-4-p-4.

8.—*Glaphurus pustulatus,* Ordovician; occipital ring entire; thorax with eleven segments; pleurae ending in strong spines, each segment bearing on each side of the axis near the dorsal furrow a tubercle with three small spines; axial rings having numerous small spines; pleurae narrow, flat, the first segment ending in a sharp spine, but the succeeding ones rounded at the ends and bearing three nearly horizontal spines; pygidium margin entire; axis with two joints; lateral lobes with 2-4 pairs of ribs; border ornamented with spines running all round.

9.—*Bounyongia bowningensis,* Silurian. Head only known. The genus has a pair of cephalic spines originating on the glabella in front of the occipital ring; this feature is not known in any other genus.

Acidaspidae:

Number of species 125, synonyms 18. Total, 107.

Doubtful reference of fragments, 25.

Acidaspis 107, *Ancyropyge* 1, *Bounyongia* 1, *Ceratopyge* 31, *Dicranurus* 3, *Glaphurus* 2, *Odontopleura* 60, *Selenopeltis* 1, (3 species of *Acidaspis* have been referred to *Trapelocera* Corda).

————Ueber die Einteilung der Familie Acidaspidae und ueber einige ihrer, Devonischen Vertreter. (Vorlänfige Mitteilung)—Centralblatt für Min., &c., Jahrg., 1917, No. 21 & 22, pp. 462-472, 9 figs. in text.

The authors arrange the Acidaspidae under six subgenera.

Acidaspis (Murch.) Barr.

Subgen. *Pseudomonaspis brighti, grayi* & *quinquespinosa.*

Primaspis subg. nov.: *Acidaspis primordialis* Barr.

Odontopleura Emmrich; *O. ovata* Emm.

Leonaspis subg. nov.; *Acidaspis leonhardi* Barr.,*pigra* Barr., ex *aff. harborti* Rich.

Ceratocephala Warder, *C. goniata* Warder.

Miraspis subg. nov.; *Acidaspis mira* Barr.

Radiaspis subg. nov.; *Acidaspis radiata* Goldf.

Ceratocephala goniata & *verneuili* Barr.; *selcana* A. Roem.

Dicranurus Conrad; *D. hamata* Conrad; *D. monstrosa* Barr.

Selenopeltis Corda; *S. buchi* Barr.

Ancyropyge Clarke; *A. romingeri.*

Glaphurus Raymond; *G. primus.*

————Ueber einzelne Arten von Acidaspis, Lichas, Cheirurus, Aristozoe, Prosocoelus, Terebratula & Spirophyton, aus der Eifel.—Jahrb. des Nassauischen Verelus für Naturk, in Wiesbaden, 70 Jahrg. 1917, pp. 144-161, pl. 1, 6 figs. in text.

Acidaspis (*Pseudomonaspis*) *bucco* sp. nov.

Lichas (*Euarges*) *mephisto* sp. nov.

Cheirurus sternbergi myops Roemer.

Aristozoe porcula sp. nov.

————Von unseren Trilobiten, II.—Bericht der Senckenb. Naturf. Ges., 1918, pp. 123-131, pl. 1-3.

Phacops schlotheimi Bronn.

Proetus cuvieri Stein; *P. chamaeleon* Rud. & E. Richt.; *P. cornutus* Goldf.

Cryphaeus punctatus Stein.

Astycoryphe senckenbergiana Rud. & E. Richt.

Bronteus alutaceus Goldf.

Tropidocoryphe barroisi Maillieux.

Acidaspis (*Leonaspis*) *elliptica* Burm., *A.* (*Radiaspis*) *radiala* Goldf.

Cyphasis ceratcphthalmia Goldf.

Lichas (*Ceratarges*) *armatus* Goldf.

————Neue *Proetus*-Arten aus den Eifler Mitteldevon.—Centralblatt für Min., &c., Jahrg. 1918, No. 3, pp. 64-70, 5 figs. in text.

Proetus (*Euproetus*) *cultrijugati* sp. nov.

Gerastos granulosus ex parte Goldf., 1843, pl. 4, fig. 4a-c.

Proetus (*Euproetus*) *cuvieri granulosus* Goldf.; *P. granulosus* Goldf., 1843, pl. 4, (not fig. 1a-c); *P.* (*Euproetus*) *chameleon* sp. nov.; *P.* (*Euproetus*) *tenuimargo* Richter, syn. *P. cornutus* Beyr., 1846, p. 28, pl. 3, fig. 9, (not Goldfuss); *P.* (*Euproetus*) *dohrni* sp. nov.

————Der Proetiden-Zweig, *Astycoryphe*, *Tropidocoryphe*, *Pteroparia*.—Senckenbergiana, Bd. 1, No. 1, & 2, 1919, pp. 1-17 & 25-51, 18 figs. in text.

Astycoryphe gen. nov.: Genotype; *A. senckenbergiana* Rud. & E. Richter; *A. gracilis* (Barr.) (*Proetus gracilis* Barr.); *A. westfalica* sp. nov.; *A. novaki* (Beyer.) (*Tropidocoryphe novaki* Beyer.); *A. brilonensis* sp. nov.; *A. champernowei* Whidborne.

Tropidocoryphe und *Pteroparia*.

Synonyms *Phoeton* Barr., 1846, ex parte, *Prionopeltis*, Group B, Corda, *Proetus* Corda, 1847, ex parte, Barrande, 1852, ex parte, Maillieuz, 1904, ex-parte, *Tropidocoryphe* Novák, 1890, *Tropidocoryphe barroisi* (Maillieux), *Proetus barroisi* (Maillieux). *T. barroisi* (Maillieux) var. a & var. b.

Tropidocoryphe filicostata Novák, 1890; *Proetus* (*Tropidocoryphe*) *filicostatus* (Novak); *T. latens* Barr., (*Proetus latens* Barr.); *T. memnon* (Corda), (*Proinopeltis memon* Corda); *T.? heteroclyta* Barr.; (*Proetus heteroclyta* Barr.).

Pteroparia Richter, 1913; *P. columbella* Richter.

————Ueber *Phacops laevis* Münster und andere Phacopiden des Vogtländischen Oberdevons.—Senckenbergiana, Bd. 1, No. 4, 1919, pp. 131-140.

Phacops laevis Münster, 1842, nov. emend., non *Calymene laevis* Münster, 1840, Beiträge 3, pl. 5, fig. 4, *Trinucleus laevis* Münster, Beiträge 5, pl. 10, fig. 6; *P. caecus* Gürich, 1896; *P. cryptophthalmus* Emm., em. Drevermann, 1901; *P.* sp. a & b and *P.* sp. indet.

Trimerocephalus griffithides sp. nov.; *T.? lotzi* Drevermann, 1901; *T. sp.*; *T.* aff. *anophthalmus* Frech.

Richter, Rudolf and Richter, E.—Continued.

————Liste der Trilobiten aus den Geeser und Auburg-Schichter der Gerolsteiner und Prümer Mulde.—Senckenbergiana, Bd. III, Heft 5, 1921.

Goldius alutaceus,—flabellifer,—scaber.

Thysanopeltis acanthopeltis.

Tropidocoryphe barroisi, & vars.

Astycoryphe senckenbergiana.

Proetus (Proetus) chamacleon,—cuvieri,—dohrni,—tenuimargo.

Proetus (Cornuproetus) cornutus.

Cyphaspis ceratophthalma,—hydrocephala, & sp.

Acidaspis (Pseudomonaspis) bucco; A. (Leonaspis) elliptica,—aries; A (Radiaspis) radiata.

Lichas (Ceratarges) armatus; L. (Eifliarges) caudimirus; L. (Euarges) mephisto.

Cheirurus (Crotalocephalus) sternbergi, mut.*myops.*

Phacops latifrons,—schlotheimi,—& ex *schlotheimi.*

Cyphaspis punctata,—stellifer.

Rowley R. R. Description of Fossils.—Contributions to Indiana Palaeontology, Green, Vol. 2, 1906, Part 2, pp. 21-31, Trilobites, plate V.

Phacops cristatus Hall, p. 21, pl. 5, fig. 1, 2, 3, 4, 27, 10, 11; *P. cristatus pipa?* Hall, p. 22, pl. 5, 6; *P. rana,* p. 22, pl. 5, fig. 7-9, 19.

Proetus microgemma Hall, p. 23, pl. 5, fig. 12, 13, 28, 30; *P. crassimarginatus?* Hall, p. 23, pl. 5, fig. 14, 15, 17; *P. sp.,* p. 25, fig. 6, hypostoma; *P. macrocephalus* Hall, p. 24, pl. 5, fig. 18.

Dalmanites selenurus Hall, p. 25, pl. 5, fig. 20; *D.* sp. p. 25, pl. 5, fig. 21, 29.

Triarthrus becki Green, p. 26, pl. 5, fig. 22.

Calymene callicephala Green, p. 26, pl. 5, fig. 23-25; *C. niagarensis* Hall, p. 27, pl. 5, fig. 26.

Phillipsia tuberculata M. & W., p. 27, pl. 5, fig. 31.

The author writes me that one of the figures on the Trilobite plates (*Dalmanites* sp., fig. 21,) is misleading, since it is composed of two distinct pygidia, curiously attached, giving the appearance of a complete specimen with a tail at each end.

Ruedemann, Rudolf. A Recurrent Pittsford (Salina) Fauna.—Bull. N. Y. State Mus., No. 219, p. 220.—Fifteenth Rep. Director, N. Y. State Museum, 1918.

A new genus, *Mixopterus,* and the following Crustacea are described:

Notes on the Fossils of the Vernon shales.

Hexameroccras chadwicki sp. nov.

Mixopterus multispinosus gen. nov. et sp. nov.

The generic term was proposed for forms like *M. multispinosus,* uniting the following characters of *Eusarcus,* viz:—subtriangular carapace, forward, submarginal position of compound eyes, subtriangular form of metastoma, predominant length of second pair of endognathites and decreasing length of the following pairs of endognathites; powerful swimming legs with long blades, short proximal joints, and curved telson spine.

Compared with *Stylonurus (Ctenopterus),* it has a relatively narrow preabdomen, a gradually contracting postabdomen, and a series of longitudinally arranged, vertically attached spines upon the longer endognathites.

A feature "sui generis" in this genus is the "dorsal furrows" upon the preabdomen.

Hughmilleria phelpsae sp. nov.; *Pterygotus? vernoncnsis* sp. nov.

Bibliography of *Eurypterus.*

————Palaeontologic Contributions from the N. Y. State Museum. Notes on the habitat of the Eurypterids.—Bull. N. Y. State Mus., 189, 1916, pp. 113-115.

———— The Palaeontology of Arrested Evolution.—Address, President, Palaeont. Soc., Dec. 1916.—Thirteenth Rep. Director N. Y. State Mus., 1916, pp. 107-134.

The Trilobites contain a few persistent genera, viz:

Ordovician—Devonian:—*Goldius, Calymene, Conolichas, Cyphaspis, Hoplolichas.*

Ordovician-Carboniferous:—*Proetus.*

Branchiopoda contain the following:

Devonian-Pleistocene:—*Estheria.*

Ostracoda the following:

Ordovician-Devonian:—*Beyrichia, Primitiella.*

Ordovician-Carboniferous:—*Aechmina, Bollia, Entomis, Leperditia, Ulrichia.*

Ordovician-Permian:—*Primitia.*

Ordovician-Recent:—*Bairdia, Bythocypris, Cypridina, Cytherella, Macrocypris.*

Silurian—Recent:—*Pontocypris.*

Permian-Recent:—*Cythere.*

Cirripedia the following:

Cambrian?-Devonian:—*Turrilepas.*

Ordovician-Devonian:—*Lepidocoleus.*

Merostomata the following:

Ordovician-Devonian:—*Pterygotus.*

Ordovician-Permian:—*Eurypterus.*

————Palaeontological Contributions from the N. Y. State Museum. 3.—On Some Cases of Reversion in Trilobites.—Sixteenth Rep. Director N. Y. State Museum and Sci. Dept., 1921, pp. 70-78, fig. 8-20.

The author remarks on *Triarthrus spinosus* Billings that he has found this characteristic trilobite of the Canadian Gloucester shales among material from the upper Utica shales at Holland Patent, N. Y. These specimens exhibit a series of three successive spines on the axis of the thorax on the eighth, ninth and tenth axial rings, and also on the eleventh to the thirteenth thorax segments. Finally also some of the pleurae of the thorax seem to have been produced at times into long, recurving spines; this is at least suggested by two such spines found, apparently attached to a fragment of a pleura lying partly below a specimen.

The peculiar lateral spine of the free cheek, and the series of long spines on the posterior segments, are characters not seen in Ordovician or later trilobites, but known in certain early Cambrian forms, especially of the family Mesonacidae. Also the long nuchal spine on the occipital ring is very strongly developed in the Mesonacidae, but rarely seen in Ordovician or later trilobites.

Ruedemann quotes Dr. Clarke's remarks on *Proboloides cuspidatus* from the Devonian in regard to the lateral spines on the cheeks.

On page 76 the author gives a list of Cambrian genera having an axial line of spines, such as *Albertella, Zacathoides, Neolenus, Elliptocephala, Mesonacis, Callavia, Holmia, Wanneria, Paedeumias, Bathyuriscus, Dolichometopus, Ogygopsis* and *Asaphiscus*. These genera contain species with rows of long spines or prominent mucros, while in the following Ordovician to Devonian periods this feature becomes suppressed to such an extent that, for example, in Barrande's array of trilobites not a single form with this row of spines is found. Some Devonian trilobites of New York, viz.: *Cryphaeus (Asteropyge) boothi, callitelcs, Phacops cristatus* and *Calymene platys* retain faint tubercles on the axial line, and none, not even the highly spinose Acidaspidae, exhibit rows of axial spines.

RUEDEMANN, RUDOLF.—Continued.

————5.—A New Eurypterid from the Devonian of New York, p. 88.
Pterygotus inexpectans sp. nov., p. 88, fig. 29-32.

————6.—Preservation of an Alimentary Canal in an Eurypterid, p. 92.
Eusarcus newelini Clatpole, p. 92, fig. 33-35.

————7.—Notes on *Caryocaris* Salter.

Caryocaris wrighti, p. 96, fig. 36; *C. curvilatus* Gurley, p. 96, fig. 39-51.

Gurley referred the genus to the Graptolites from its supposed resemblance to *Dawsonia*.

Ruedemann referred it to the Crustacean order and to the Lower Ordovician or Canadian instead of the Cambrian.

————On the Occurence of an *Apus* in the Permian of Oklahoma.—Jour. of Geology, Vol. XXX, 1922, pp. 311-318, 5 figs. in text.

Apus beedei sp. nov., fragments.

Carapace small, broadly eliptic, nearly circular in outline, with a small posterior emargination, shield-like, and sloping from the subcentral apex, abruptly forward, more gently backward. A transverse cervical fold situated about one-fifth of the length of the carapace posterior to the anterior border; immediately posterior to this several large, but slightly curved "shell glands" or excretory organs, beginning at either side of the median line, and extending obliquely backward about half way to the lateral faces of the carapace, reaching to about one-fifth of the length of the carapace from the posterior border. Axial line marked behind the cervical fold by a distinct depression extending about one-third of the distance toward the posterior border.

Permian near Elkeno.

The discovery of this form carried the range of the living genus *Apus* back to Permian. The true *Apus* has only once been found in a fossil state from the Buntsandstein of the Vigesian Mountains; *Apus antiquus* Schimper, in the Triassic.

SALTER, J. W. A Catalogue of the Collection of Cambrian and Silurian Fossils in the Geological Museum of the University of Cambridge, with a Preface by Rev. Adam Sedgwick, and a Table of Genera and Index added by Prof. Morris, 1875.

Lower Cambrian.

Harlech group: *Conocoryphe lyelli* Hicks, p. 2.

St. David's group: *Plutonia* gen. nov. *sedgwicki* Hicks, p. 2, fig.

Leperditia (or *Primitia?*) *prima* Hicks.

Paradoxides harknessi Hicks.

Microdiscus sculptus Hicks.

Agnostus cambrensis Hicks.

Middle Cambrian.

Menevian group: *Agnostus princeps* Salter; *A. sp.*, p. 4, fig.; *A. davidis* Salter; *A. scarabaeoides* Salter; *A. cambrensis* Hicks, and *A. lagena* new form; *A. escutalis* Salter; *A. barrandei* Salter; *A. eskriggei* iHcks; *A. reticulatus* Angelin; *A. acumensis* Hicks.

Microdiscus punctatus Salter, p. 4, fig.

Holocephalina primordialis Salter, p. 4, fig.

Conocoryphe variolaris Salter, p. 5, fig.; *C. applanata* Salter; *C. humerosa* Salter, p. 5, fig.; *C. bufo* Hicks; *C.? homfrayi* sp. nov.; *C. sp.*; *C. coronata* Barr., p. 5 fig.

Erinnys venulosa Salter, p. 5, fig.

The fry of a Trilobite, p. 5, fig.

Paradoxides davidis Salter, p. 6, fig.; *P. hicksii* Salter; *P. aurora* Salter.

Anopolenus henrici Salter, p. 6, fig.; *A. salteri* Hicks, p. 6, fig.

Arionellus longicephalus Hicks Mss. p. 7, fig.

Olenus sp. (*O. gibbosus*) Belt. 1867, p. 7, fig.; *O. cataractes* Salter.

Primitia solvensis Jones; *P. buprestis* Salter; *P. vexata* Hicks.

Hymenocaris major Salter, sp. nov., p. 7, fig.

Ffestiniog group: *Hymenocaris vermicauda* Salter, p. 10, fig.

Agnostus trisectus Salter; *A. princeps* Salter, p. 10, fig.

Olenus micrurus Salter; *O. plantii* Salter, sp. nov., p. 11, fig.; *O.* (*Parabolina*) *spinulosus* Wahl.; *O.* (*Peltura*) *scarabaeoides* Wahl.; *O.* (*Sphaerophthalmus*) *flagellifer* Ang., p. 11, fig.; *O.* (*Sphaeropht.*) sp.; *O.* (*Sphaeropht.*) *alatus* Boeck; *O.* (*Sphaeropht.*) *expansus* sp. nov.; *O.* (*Sphaeropht.*) *humilis* Phillips; *O.* (*Sphaeropht.*) sp.; *O.* (*Sphaeropht.*) *bisulcatus* Phillips; *O.* (*Sphaeropht.*) sp.; *O.* (*Sphaeropht.*) *pecten* Salter, p. 12, fig.

Conocoryphe? ecorne Ang.; *C. williamsoni* sp. nov., p. 12, fig. (The *Beltella bucephalus* Lake, 1919); *C.* (*Conocephalus*) *invita* Salt., p. 13, fig.; *C. abdita* Salt.

Dikelocephalus celticus Salt., p. 13, fig.; *Dikelocephalus* sp.

Tremadoc Group: *Niobe homfrayi* Salter, p. 14, fig.

Psilocephalus innotatus Salter, p. 15, fig.; *P. inflatus* Salt.

Conocoryphe depressa Salt., p. 15, fig.; *C. verisimilis* Salt.

Dikelocephalus (*Centropleura*) *furca* Salter, p. 15, fig.

Angelina sedgwickii Salt., p. 17, fig.

Dikelocephalus furca Salt., p. 17, fig.

Asaphus (*Isotelus?*) *affinis* McCoy; *A.* (*Isotelus*) *homfrayi* Salt., p. 17, fig.

Ogygia scutatrix Salt. (hypostoma).

Cheirurus frederici Salter, p. 17, fig.

Skiddaw Group:

Agnostus hirundo Salter, Mss., p. 2, fig.; *A. morei* Salt.

Phacops nicholsoni Salter.

Calymene vexata Salt. (with *Asaphus menapiae*) undescribed; *C. ultima* Salter (*C. ramseiae* Hicks), undescribed; *C. tristani* Brong.; *C. parvifrons* Salter.

Dionide atra Salter.

Trinucleus gibbsii, p. 23, fig.

Ampyx salteri Hicks, Mss.

Homalonotus sp. (*H. bisulcatus*) p. 22, fig.; *H. monstrator* Salt., undescribed.

Aeglina caliginosa Salt.; *A. boia* Hicks; *A. binodosa* Salt., p. 23, fig.; *A. grandis* Salt.

Ogygia selwynii Salt., p. 23, fig.; *O. peltata* Salt.; *O. sp.*; *O. bullina* Salt.

Asaphus solvensis Hicks, Mss.; *A. menapiae* Hicks, undescribed, p. 3, fig.

Upper Cambrian, (Cambrian-Silurian).

Lower Bala Group: *Cythere* (*Cytheropsis*) *aldensis* McCoy, p. 31, fig.

Primitia, one or two species.

Beyrichia complicata Salter, p. 31, fig.

Agnostus maccoyii Salter; *A.* sp.

Diplorrhina triplicata syn., p. 31, fig.

Trinucleus favus Salt. (*T. gibbifrons* & *T. caractaci* McCoy, p. 144) p. 31, fig.; *T. fimbriatus* Murch. (*T. gibbifrons* as var. of McCoy, p. 145.)

Ampyx nudus Murchison.

Conocoryphe monile Salt., sp. nov., p. 32, fig., *Conocoryphe* or *Triarthrus.*

Aeglina sp.; A. sp.

Ogygia cordensis; O. buchii Brong., p. 32, fig.; *O. angustissima* Salter.

Barrandia (*Ogygia*) *radians* McCoy, p. 33, fig.; *B. cordai* McCoy.

SALTER, J. W.—Continued.

Asaphus? sp.

Lichas patriarchus Edge.

Cheirurus (*Eccoptochile*) *sedgwickii* McCoy.

Calymene cambrensis Salt., p. 33, fig.

Homalonotus bisulcatus Salter.

Asaphus (*Isotelus*) *laticostatus* McCoy, (not of Greene); *A. tyrannus* Murch., p. 33 fig., hypostoma, p. 34, fig.

Illaenus crassicauda.

Middle Bala Group: *Ceratiocaris? umbonatus* Salt.

Primitia maccoyii Salt. Mss.; *P. maccoyii,* var.; *P. strangulata* Salt., p. 48, fig.

Agnostus trinodus Salt.

Lichas laciniatus Dalm.; *L. laxatus* McCoy; *L.* (*Trochrus*) *nodulosus* Salt., p. 50, fig.

Acidaspis brightii Murch., p. 50, fig.

Staurocephalus murchisoni Barr.

Sphaerexochus boops Salt. (syn. *Ceraurus clavifrons* McCoy, pl. 1F, fig. 12) p. 50, fig.

Cheirurus juvenis Salter, (*Ceraurus clavifrons* McCoy, pl. 1G, fig. 9), p. 51, fig.; *C. octolobatus* McCoy.

Cybele verrucosa Dalm.; *C. rugosa* Portl., p. 50, fig.

Encrinurus multiplicatus Salt.; *E. sexcostatus* Salt.

Phacops (*Acaste*), p. 52, fig.; *P.* (*Acaste*) *apiculatus* Salt.; *P.* (*Acaste*) *alifrons* Salt.; *P.* (*Chasmops*) *macrourus* Sjögren; *P.* (*Chasmops*) *conicophthalmus* Boeck.

Calymene senaria Conrad; *C. blumenbachii* Brong.; *C.* var. *caractaci* Salt.

Homalonotus bisulcatus Salt.; *H. sedgwickii* Salt.; *H. rudis* Salt.

Asaphus powisii Murch.; *A. radiatus* Salter.

Illaenus bowmanni Salt.; *Ill. davisii* Salt.; *Ill. rosenbergii* Eichwald; *Ill.* sp.

Harpes parvulus McCoy.

Upper Bala Group: *Beyrichia complicata.*

Phacops stokesii Milne Edw.

Cyphaspis megalops McCoy, p. 77, fig.

Cheirurus bimucronatus Murch.

Illaenus thompsoni Salter; *Ill. bowmani* Salter.

Lichas bulbiceps? Salter & Phillips.

Encrinurus punctatus Brünn, p. 77, fig. (the same fig. on p. 51); *E. punctatus* arenaceus *Salter.*

Calymene blumenbachii Brong.

Phacops obtusicaudatus Salt.; *P. sp.*

Silurian.

May Hill Group:

Crustacea.

Encrinurus punctatus Brünn.

Cheirurus bimucronatus Murchison.

Phacops stokesii Milne Edw.; *P. weaveri* Salt.; *P. caudatus* Brong.

Illaenus thompsoni Salter.

Proetus stokesi Murch., p. 56, fig.

Silurian.

Lower Wenlock Group:

Homalonotus cylindricus Salt.

Phacops downingiae Murch. and var. *cuneatus* Salt.; *P. caudatus. corrugatus* Salt.; *P. stokesii* Milne Edw.

Acidaspis hughesii sp. nov., p. 93, fig.

Phyllopoda.

Peltocaris anatina sp. nov., p. 93, fig.

Wenlock Group:

Lichas, p. 130, fig.; *Lichas scutalis* Salt. mss.; *L. salteri* Fletcher; *L. grayii* Fletcher & Salter; *L. hirsutus* F. & S.; *L. barrandei* F. & S.; *L. anglicus* Beyrich.

Cheirurus Beyrich, *Cheirurus bimucronatus* Murchison.

Eucrinurus Emmrich; *E. punctatus* Brünn; *E. variolaris* Brong.

Sphaerexochus Beyrich, *S. mirus* Bey., p. 131, fig.

Staurocephalus Barr., *S. murchisoni* Barr.

Phacops downingiae Murch. and var. *constrictus* Salt.; *P. stokesii* Milne Edw.; *P. mushcni* Salt.; *P. caudatus* Brong.; *P. longicaudatus* Murch. and var.; *P. grindrodianus*, also var. *armiger* Salt.; *P. tuberculato-caudatus* Salt.

Calymene Brong. *C. blumenbachii* Brong.; *C. tuberculosa* Salt.

Homalonotus König, p. 133, fig., *H. delphinocephalus* Green; *A. johannis* Salt.

Illaenus insignis Hall.

Cyphaspis Burmeister, *C. megalops*, p. 133, fig.

Proetus Steininger, p. 133, fig., *P. sp.; P. latifrons* McCoy; *P. fletcheri* Salt.; *P. stokesii* Murch.

Acidaspis Murchison, p. 134, fig.; *A. coronata* Salt.; *A. brightii* Murch.; *A. dama* Fletcher & Salter; *A. quinquespinosa* F. & S.; *A. barrandei* Ang.

Lower Ludlow Group:

Ceratiocaris McCoy, p. 165, fig.; *C. leptodactylus* McCoy; *C. robustus* Salter.

Ptyygotus (Agassiz), p. 165, fig.; *P.* ?; *P. arcuatus* Salter.

Slimonia Page, p. 165, fig.; *S. punctata.*

Proetus latifrons McCoy, p. 165, fig.

Phacops downingiae Murch.; *P.* (*Portlockia*) *stokesii* Milne Edw., p. 166, fig.

Calymne blumenbachii Brong.; *C. tuberculosa* Salt.

Acidaspis coronata Salter, p. 166, fig.

Upper Ludlow Group:

Phyllopoda.

Dictyocaris slimoni Salter, p. 177, fig.

Beyrichia kloedeni McCoy, and var. *plicata* McCoy.

Ceratiocaris inornatus McCoy, p. 178, fig.; *C. solenoides* McCoy; *C. papilio* Salt.; *C. atygius* Salt.; *C. ellipticus* McCoy.

Hemiaspis aculeatus Salter, p. 178, fig.

Eurypterida (*Hemiaspis*).

Eurypterus cephalaspis Salt.; *E. lanceolatus* Salt.

Pterygotus sp.; P. bilobus Salt., p. 179, fig.; *Pterygotus* 2 sp.; *P. perornatus* Salt.; *P. gigas; P. banksii* Salt.

Slimonia acuminata Salt.; *S.* sp. nov?

Beyrichia klöedeni McCoy, p. 189, fig.

Leperditia marginata Keys, p. 189, fig.

SCHLUETER, CLEMENS. Ueber *Trilobites verticalis* Burm. und *Phillipsia verneuili* Barr., 1846.—Verhandl. der naturhist. Vereins für Rheinland und Westf., Sitzungsb., 1880, p. 226.

————Zuletzt legte Redner *Cryphaeus* (*Asteropyge*) *limbatus* aus den Dachschiefern von Bundenbach vor.—Sitzungsb. der Niederrheinischen Ges. in Bonn, 1881, p. 77.

Schlueter, Clemens.—Continued.

————Legte einen der Gruppe der Merostomen angehörigen Krebs aus den Rheinischen Unter Devon vor.—Sitzungsb. der Niederrheinischen Ges. in Bonn, 1881, p. 210.

Eurypterus cf. *pygmaeus* Salter.

Schmidt, E. *Cryphaeus* in den Siegener Schichten.—Monatsberichte der Deutsch. Geol. Ges., 1907, pp. 1-12, fig. in text.

Cryphaeus (*Asteropyge*) *atavus* sp. nov., pl. 10, fig.

Schumacher, R. Ueber Trilobitenreste aus dem Unterkarbon im östlichen Theil des Rossbergmassivs in den Südvogesen.—Zeitschr. Deutsch. Geol. Ges., Vol. 55, 1903, pp. 432-438, pl. 19.

Schwartz, — —. South African Palaeozoic Fossils.—Record Albany Museum, Vol. 1, 1906, pp. 347-404, plates 6-10.

Seeman, F. Das Mitteböhmische Obersilur, und Delongebiet S. W. der Beraun.—Beiträge zur Palaeont. & Geol. Oesterreich-Ungarns, Bd. 20, 1907, pp. 69-114, pl. IX, X.

Shipley A. E. Introduction to Arachnida and Xiphosura.—The Cambridge Nat. Hist., Vol. IV, 1920, pp. 253-279, figs. in text 151-160.

Palaeozoic.

Subfamily 1, Xiposuridae.

Genera, *Hemiaspis, limuloides,* fig. 159; *Belimurus reginae,* fig. 160.

In the Palaeozoic genera the median or axial part of the dorsal surface is raised and distinctly limited on each side, so presenting a trilobed appearance similar to that of Trilobites. In *Neolimulus, Belinurus* and *Prestwichia* lateral eyes are present on the sides, on the axial parts of the carapace, and near its front margin; median eyes have been found in the two last named genera.

The author also remarks that *Aglaspis* has been regarded as a Xiphosuran. Other genera of Palaeozoic Xiphosura are *Bunodes, Bunodella, Pseudomiscus, Protolimulus* and *Prolimulus.*

The generic name *Prestwichia* Woodward, 1867, not Lubbock, 1863, is a synonym and the genus *Euproops* is available in its place.

Sieburg, R. Ueber transversale Schieferung im Thüringischen Schiefergebirge (Inaugural-Dissertation).—Zeitschr. für Prakt. Geol. Vol. 17, 1909, pp. 233-262, figs. plate 3.

The plate illustrates "Trilobiten aus dem ostthüringischen Griffelschiefer," fig. 12-15 without description.

Siemiradzki, J. von. Die Paläozoischen Gebilde Polodiens 11.—Beiträge Palaeontoesterr.—Ung., Vol. 19, 1906, pp. 213-286.

Sjöberg, Sig. Beschreibung einer neuen Trilobiten-Art aus dem Schwarzen Trinucleusschiefer Ostergothlands.—Geol. Förens, Förhandl., Bd. 40, 1918, pp. 457-460, pl. 7.

Gives list of the Ostergothlands *Trinucleus* beds.

Telephus wegelini Ang.; *Proetus papyraccus* Törnquist, *Trinucleus seticornis* His.; *Calymene trinucleina* Linrs.; *Remopleurides radians* Barr.; *Ampyx portlocki* Barr., of the Trilobites.

Ostracoda.

Lepidocoleus suecicus Mbg.; *Plumulites sp.*

With figs. and description of *Niobe cunctatrix* sp. nov., p. 458, pl. 7, fig. 1, 2. from Ullnäs.

Sobolev, D. Materialien zur Geologie Russlands. (In Russian).—The Middle Devonian of the Kielce-Sandomir Mountains.—Kaiserlichen Mineralogischen Gesellschaft, Bd. 24, 1909.

Trilobita:

Bronteus granulatus Golf., p. 381, p. 3, fig. 1.

Phacops sp. (cf. *fecundus* Barr.), p. 382; *P. latifrons* Bronn, p. 382; *P. schlotheimi* Bronn, p. 338; *P. breviceps* Barr., p. 383, pl. 3, fig. 6a, b; *P.* cf. *breviceps* Barr., p. 384, pl. 3, fig. 3, 4; *P. sp.*, p. 386, pl. 3, fig. 5a-c.

Acidaspis sp. Gür., p. 387.

Cyphaspis sp., p. 387.

Proctus crassimargo A. Roemer, p. 388, pl. 3, fig. 7; *P. margaritaceus* Gürich, p. 388; *P. sp.*, p. 389; *P. pyriformis* Gür., p. 389; *P.* cf. *cornutus* Foldf., p. 389.

Dechenella? dombrowiensis Gürich, p. 389, pl. 3, fig. 8, 9; *D. polonica* Gür., p. 392, (both referred by Richter to subgenus *Eudechenella*).

Ostracoda:

Entomis sp., p. 392 & 393.

Leperditia amphiporae Gürich, p. 393.

Primitia humiliformis Gürich, p. 393; *P. ubiqua* Gürich, p. 393; *P. ornatissima* Gür., p. 393; *P. plana* Gür., p. 393; *P. lentiformis* Gür., p. 393; *P. fabaeformis* Gür., p. 393; *P. sp.*, p. 393.

Primitiopsis? pisciformis Gür., p. 394.

Beyrichia? trigonata Gür., p. 394.

Bollia sp., p. 394.

Polyzygia symmetrica Gürich, p. 394.

Poloniella devonica Gürich, p. 394.

Sommer, K. Die Fauna des Culm von Königsberg bei Giessen.—N. J. für Min., Beilage, Bd. 28, 1909, pp. 611-660, pl. 27-30.

Crustacea:

Phillipsia eichwaldi hassiaca, p. 652, pl. 29, fig. 17, (pygidium).

Phillipsia gemmulifera, p. 652, pl. 28, fig. 6, (pygidium).

Spriestersbuch, Julius, & Fuchs, Alexander. Die Fauna der Remscheider Schichten.—Abhandl. Geol. Landesanstalt, N. F., Heft 58, 1909.

Crustacea:

Beyrichia montana sp. nov., p. 48, pl. 7, fig. 11, 11a; pl. 8, fig. 1, 2; *B. embryoniformis* sp. nov., p. 50, pl. 7, fig. 8-10.

Entomis sp., p. 51.

Cryphaeus sp., p. 51.

Staff, Hans von und Reck, Hans. Ueber die Lebensweise der Trilobiten.—Sitz. der Gesellschaft Nat. Freunde zu Berlin, No. 2, Jahrb., 1911, pp. 130-146, 19 figs.

The use of the pygidium as a swimming organ, suggested by Spencer in Geol. Mag., Decade IV, Vol. 10, 1911, on theoretical grounds, was well developed by the authors from a mechanical standpoint, and elaborated by evidence from ontogeny, phylogeny and musculature, providing the animal with a swifter means of locomotion. By a sudden flap of this large fin, a backward, darting motion could be obtained, which would be invaluable as a means of escape from enemies.

Staff and Reck seem to think that in this movement the two shields were clapped together, and that the animal was projected along, with the hinge-like thorax forward.

STAFF, HANS VON UND RECK, HANS.—Continued.

The authors give entire figures of *Olenellus (Holmia) bröggeri,* fig. 1; *Harpes ungula,* fig. 2, 3; *Olenellus thompsoni,* fig. 4; *Dalmanites caudatus,* fig. 5; *Microdiscus speciosus,* fig. 6; *Agnostus pisiformis,* fig. 7; *Leiagnostus erraticus,* fig. 8; *Microdiscus bellimarginatus,* fig. 9; *Aeglina rediviva,* fig. 10; *A. pachycephala,* fig. 11; *A. prisca,* fig. 12; *Illaenus schmidti,* fig. 13, 14; *Bronteus brongniarti,* fig. 15; *Asaphus kowalewski,* fig. 16; *Illaenus sinuatus,* fig. 17; *Deiphon forbesi,* fig. 18; *Acidaspis mira,* fig. 19.

STAINER, X. Stratigraphie du bassin Huiller de Charleroi et de la Basse-Sambre.—Bull. Soc. Belge de Geol. & Paleont. &c., Tome XV, 1901, p. 43.

Announces the discovery of the thorax, apparently of a new species of *Prestwichia (Euproops).*

STAUFFER, CLINTON R., HUBBARD, G. D. & BROWNOCKER, J. A. Geology of the Columbus Quadrangle.—Bull. Geol. Sur. Ohio, 14, Ser. 4, 1911, pp. 1-33, pl. 8-13.

Not descriptive; figures on plates.

Pl. XI. *Phacops cristatus* Hall, fig. 3, 4; *Chasmops calypso* Hall, fig. 5; *Coronura diurus* Green, fig. 6, 7; *Proetus rowei?* Green, fig. 9.

Pl. XII. *Phacops rana,* fig. 24.

Pl. XIII. *Phillipsia lodiensis* Meek, fig. 15.

STEINMANN, — —. See KNOD, R. VON.

STEPHENS, T. On the discovery of Trilobites and other Silurian Fossils in Tasmania.—Proc. Roy. Soc. Tasmania, 1874, p. 27.

STRAELEN, V. VAN. See VAN STRAELEN, V.

SVENONIUS, FR. Beskrifning till Kartbladen Forsmark och Björn.—Sveriges Geol. Undersökning, Ser. A/a. No. 98 & 99.

Seite 31, Nach den Bestimmungen der Herren J. C. Moberg und G. O. von Schmalensëe, gehöre die hier vorkommenden Fossilien zu folgenden Arten.

Crustacea:

Lower Orthocerenkalk.

Megalaspis limbata Boeck; *M. stenorachis* Ang.

Niobe cf. *emarginula* Ang.; *N. sp.*

Illaenus esmarcki Schlot.

SWINNERTON, H. H. The Facial Suture of Trilobites.—Geol. Mag., Decade VI, Vol. 6, 1919, pp. 103-110.

This paper takes under consideration the following questions:

The segmentation of the head; the position of the eye; the ecdysial line in Mesonacidae; the ecdysial line in Agnostidae; the ecdysial line in Trinucleidae; the incorrect usage of embryological evidence.

The Trilobites are Monophyletic.

————Suggestions for a Revised Classification of Trilobites.—Geol. Mag., Decade VI, Vol. 2, 1915, pp. 487-496 & 538-546.

The author remarks that Beecher's classification has been adopted without modifications of its broad lines by English and American, but not by all continental writers. Among the latter, Gürich and Jaeckel have recently suggested systems which differ materially from Beecher.

Swinnerton gives Gürich's classification on p. 488, and remarks that Jaekel, after careful study of the Agnostidae, considers that these Trilobites are sufficiently distinct from all others to warrant their being placed in a separate

division equal in value to that containing all other Trilobites. He therefore proposed the name Miomera for those which, like Agnostidae and Microdiscidae, have only three trunk segments, and Pliomera for all with six or more free segments.

Swinnerton's classification of Trilobites.

Progressive stages:

Micropygous, without free cheeks. (Order Protoparia.)

Heteropygous, with free cheecks, which may be lost secondarily.

Isopygous.

Order Opisthoparia:

Mesonacidae; Homopleuridae; Paradoxidae; Zacanthoidae; Proetidae; Olenidae; Oryctocephalidae; Conocoryphidae; Selenopleuridae; Ptychoparidae; Dikelocephalidae; Bathyuridae; Asaphidae; Illaenidae; Calymenidae; Homalonotidae; Trinucleidae; Harpedidae; Raphioridae; Ellipsocephalidae; Aeglinidae; Shumardidae.

Odontopleurides: Lichadidae; Bronteidae.

Order Proparia:

Encrinuridae; Cheiruridae; Phacopidae; Burlingidae; Agnostidae?

All those families whose descent can be traced back to the Conocoryphid type of primitive Trilobites may be placed in the suborder Conocoryphida, which may be broken into four sections, viz: Conocoryphina; Olenina; Ptychoparina; and Calymenina.

Torley, K. Die Fauna des Schledenhofes bei Iserlohn, (Devonian).—Abhandl. der Königlich Preuss. Geol. Landesanstalt, N. F. 53, 1908, pp. 1-56, plates I-X.

XI. Trilobita, p. 46.

Bronteus granulatus Goldf.

Phacops breviceps Barr.

Proetus cornutus Goldf.

Trigonaspis? cornuta Sandber., 1856, pl. 3, fig. 3.

Proctus crassimargo Roem.; *P.* cf. *astyanax* Holz.

Cyphaspis hydrocephala Maurer.

Lichas sp.

Harpes sp.

Touche, J. D. La. See La Touche, J. D.

Troedsson, Gustaf T. On Skänes Brachypodskiffer, 104 pages, 2 plates, 13 figs. in text.—Lunds Univ. Arsskrift, N. F. Avd. 2, Bd. 15, No. 3. —Kungl. Fysiografiska Sällskapets Handlingar, N. F., Bd. 30, No. 3, 1918.

The author notes the following species with descriptions and illustrations, and an English summary.

Phyllocaridia :

Ceratiocaris sp.

Cirrepedia:

Lepidocoleus succicus Mrg.

Ostracoda:

Primitiella tenera Linrs.; *P. harparum* sp. nov.; *P. conica* sp. nov.; *P. bursa scanensis* var. nov.; *P. ?bilba* sp. nov.; *P.* cf. *tolli* Bonnema.

Aechmina grönwalli sp. nov.

Ctenobolbina sexpapillosa sp. nov.; *C. rara* sp. nov.

Bollia harparum sp. nov.; *B. biplicata* sp. nov.

Jonesina rectangularis sp. nov.

Trilobita:

TROEDSSON, GUSTAF T.—Continued.

Dalmanites eucentrus Ang. (Olin emend.); *D. mucronatus* Brong.; *D. kiaeri* sp. nov.

Ampyx acus sp. nov.

Trinucleus sp.

Homalonotus platynotus Dalm.

Acidaspis olini sp. nov.

Harpes sp.

Proetus sp.

Bibliography Om Skänes Brachyopodskiffer, pp. 100-104.

The author gives a comparison between *Dalmanites eucentrus* and *D. mucronatus.*

	D. eucentrus	*D. mucronatus*
Frontal limb	Very thin, commonly not visible.	Broader and well developed.
Lateral furrows of glabella	Shallow.	Deep.
Frontal lobe	Without tubercles.	Covered with coarse tubercles.
Posterior branch, facial suture	Slightly sigmoid.	Strongly sigmoid, (young specimens; largest specimens more like *D. eucentrus.*)
Eyes	Reaching from the anterior to the middle, (large specimens) or to between the middle and posterior pair of furrows (ephebic specimens.)	Ephebic specimens, large, reaching from the anterior to the posterior pair of lateral furrows. Larger specimens like *D. eucentrus.*
Pygidium, axis rings	8-9.	11-13.
Pleurae	6-7; anterior part about half as broad as the posterior, which widens outward.	8-9; two halves equally developed. Neanic specimens sometimes like *D. eucentrus.*
Furrows of lateral portions	Oblique and interpleural furrows equally developed.	Oblique furrows generally more marked than interpleural ones.

The ontogenetic development of *D. eucentrus* is closely allied to that of *D. socialis.*

The nepionic stage of development of the head has more pleurae than adult specimens, which depends on the fact stated by Richter that the posterior pleurae tend to fuse along the axis.

D. eucentrus belongs perhaps to that primitive section of the *Dalmanites* group which has been termed *Dalmanitina* Reed, but the strange alternation of the appearance of the two named species, in the succeeding life zoaeas, suggests more, that *D. eucentrus* is an immature stage of *D. mucronatus,* and a result of retarding external circumstances, after the ceasing of which, a perfect development has taken place.

ULRICH E. O. Ordovician Hypoparian Genera of Trilobites.—Abstr. Bull. Geol. Soc. Am., Vol. 33, 1922, pp. 205-206.

The author discussed the character, interrelations, stratigraphic position, and

geologic distribution of the Agnostidae, Trinucleidae, and Ampyxidae found in the Ordovician formation in America.

Most of the genera were shown to have originated in the North American Atlantic realm, from which they invaded the Appalachian Valley troughs.

Only *Cryptolithus* seems to have had a more southern origin, most of its species having invaded the interior continental seas by way of the Mississippi embayment.

Trinucleidae & Harpeidae.

The author disapproved the prevailing view that the marginal suture of species of these families corresponded to the facial suture. He opposed the view that the facial suture in these trilobites ran as in the Opisthoparia and became closed by fusion early in the life of the individual.

He held that the marginal suture became a necessary convenience in moulting and possible through the lateral and the posterior extension of the epistoma. He remarks that *Olenellus* has a ventral plate that is comparable to the ventral plate of the cephalon of *Harpes*.. As is well known, the facial suture in *Olenellus* is quite as well fused as in *Harpes*.

Endymionidae.

The author questioned the desirability of the family Endymionidae Raymond, and dissents from the prevailing practice of referring all Ordovician Harpeidae, except *Harpides*, to *Eoharpes* Raymond. He prefers to retain most of them in the genus *Harpes*.

Ampyxidae.

He remarks that *Raphiophorus* Angelin cannot be separated satisfactorily from *Ampyx*, but *Lonchodomus* is distinguishable by differences in the facial suture and in the anterior margin of the cephalon.

Ampyxina bassleri gen. nov. et sp. nov.

A new genus is proposed for a small Ampyxid with a small and very short rostral spine, obovate glabella, small pair of isolated posterior lateral glabellar lobes and 4 to 5 thorax segments. The pygidium differs from *Ampyx* and *Lonchodomus* in wanting the thick, striated and beveled posterior edge.

Maquoketa shale, Louisiana, Missouri.

Some six species are known, but older than the genotype, Lower Trenton and Chazyan, not at present described. Rowley illustrated and described as gen.? sp.? *Ampyxina bassleri* in the Geol. of Pike County, Mo., Bur. Mines, Vol 8, 1909, p. 60, pl. 15, fig. 12-14.

VAN STRAELEN, V. Quelques Eumalacostracés Nouveaux du Westphalien Inférieure d'Argenteau prés Lié.—Ann. Soc. Geol. de Belgique, Tome XLV, Mémoires, 1922, pp. 35-40, plate 2.

Palaeocaris lohesti, sp. nov., p. 36, fig. 1 in text; pl. 2, fig. 1.

Compared with *P. burnetti* Woodward, the new species differs in the telson and uropodes, which are of the same length in *P. burnetti,* but in *P. lohesti* the length of the uropodes is three times that of the telson.

Perimecturus frayponti, sp. nov., p. 37, fig. 2 in text; pl. 2, fig. 2, 3, 5.

The author divides the genus *Perimecturus* Peach into two groups:

Group 1. *P. parki* Peach; *P. stocki* Peach; *P. communis* Peach.

Group 2. *P. elegans* Peach; *P. pattoni* Peach; *P. ensifer* Peach; *P. frayponti* Straelen.

Anthracomysis rostrata, sp. nov., p. 39, fig. 5 in text; pl. 2, fig. 4.

The genus is placed under a new subfamily, Anthracomysidinae.

————Sur la présence d'un Xiphosure dans le Westphalien des Environs de Liége.—Ann. Soc. Géol. de Belgique, Tome XLV, Bulletin, 1922, pp. 91, 92.

Prestwichia rotundata de Koninck, 1881, (pro parte) is referred to *Prestwichianella* (for de Koninck's figures of the pygidia, No. 1 & 2).

VENUKOV, P. N. Die Fauna der Silurischen Ablagerungen des Gouvernements Podolien.—Verh. Russ. K. Min. Ges., Ser. XIX, 1899, pp. 21-266, pl. 1-9.

VINASSA, REGNY P. E.DE. Fauna dei Calcari con *Rhynchonella megaera* del Passo di Volaia.—Bull. Soc. Geol. Ital., Vol. 27, 1909, pp. 547-592, fig. pl. 20.

WADE A. On the Llandovery and Associated Rocks of North-Eastern Montgomeryshire.—Quart. Jour. Geol. Soc., Vol. 67, 1911, pp. 415-459, pl. 33-36.

Notes on the Palaeontology of the area, pp. 449-456.

Trinucleus intermedius sp. nov. The name *intermedius* was used by Münster for a species of *Trinucleus* in 1842, which is now referred to *Goldius subradiatus*.

This remarkable species is readily distinguished from *Cryptolithus concentricus* by the large, pendent ears of the fringe and the direct backward extension of the spines. From *T. lloydii* it is distinguished by the subtriangular tail.

Dionide sp?

Ostracoda:

Melanella gen. nov.

Carapace small, equivalve, moderately convex, rather flattened anteriorly, straight; valves with a small, faintly raised, horseshoe ridge confined to the posterior half, enclosing a small, semi-circular sulcus; eyes simple.

Melanella homidiscus sp. nov.

Primitiella unicornis Ulrich.

Primitia ulrichi Jones; *P. tumidula* Ulrich.

Ctenobolbina cf. *ciliata* Emmons.

Bollia lata Vanuxem.

Krausella arcuata Ulrich.

WALCOTT, CHARLES D. Cambrian Geology and Palaeontology, IV. No. 3, Fauna of the Mount Whyte Formation.—Smith. Misc. Coll., Vol. 67, No. 3. 1917, pp. 62-114, pl. 8-14.

Agraulos charops sp. nov.; *A.? unca* sp. nov.

Olenopsis cleora sp. nov.; *O. crito* sp. nov.; *O. leuka* sp. nov.

Ptychoparia adina sp. nov.; *P. carina* sp. nov.; *P.? cercops* sp. nov.; *P.? cleadas* sp. nov.; *P. cleon* sp. nov.; *P. clusia* sp. nov.; *P. cosus* sp. nov.; *P. pia* sp. nov.; *P. skapta* sp. nov.; *P. thia* sp. nov.; *Ptychoparia* sp. undetermined. *cunras* sp. nov.; *P. gogensis* sp. nov.; *P. lux* sp. nov.; *P. perola* sp. nov.; *P.*

Crepicephalus cecinna sp. nov.; *C. celer* sp. nov.

Dorypyge damia sp. nov.

The author remarks that *P.? cleadas* may be readily separated from other species of the genus *Ptychoparia* by its very small size and angular outline, its sharply defined trapezoidal glabella, and its very small anterior eye, placed far forward so that the posterior lobe is consequently very wide, &c.

(It might be compared with *Lloydia*.)

————Cambrian Geology and Palaeontology, IV. No. 4. Appendages of Trilobites.—Smith. Misc. Coll., Vol. 67, No. 4, 1918, pp. 115-216, pl. 14-42, figs. in text 1-3.

Description of species with appendages.

Neolenus serratus (Rominger); *Kootenia dawsoni* (Walcott); *Isotelus maximus* Locke; *I. covingtonensis* Ulrich? Mss.; *Triarthrus becki* Green; *Ptychoparia cordillerae* (Rominger); *Calymene senaria* Conrad: *Ceraurus pleurex-*

anthemus Green; *Odontopleura trentonensis* (Hall); *Cryptolithus concentricus* Eaton.

Section 2. Structure of the Trilobite.

Respiration of the Trilobite.

Restoration of the ventral appendages, &c.

Comparison with Crustaceans.

Comparisons of early authors.

Walcott compares the Trilobite with other modern crustaceans (e. g. Mysidacea, Euphausiacea, and some of the Schizopods), but they would only go to prove that the Trilobite is a primitive crustacean far back on the line of descent from the original crustacean type which existed in pre-Cambrian or Liparian time.

————Cambrian Geology and Palaeontology, IV. No. 7. Notes on Structure of *Neolenus*.—Smith. Misc. Coll., Vol. 67, 1921, No. 7, pp. 365-456, text figs. 15-23, pl. 91-105.

Notes on ventral appendages of *Neolenus serratus* by E. O. Ulrich, Rudolph Ruedemann and R. S. Bassler, with comments by C. D. Walcott.

The distinctness of epipodites from exopodites, with figures and descriptions; also supplementary notes on *Ceraurus pleurexanthemus, Calymene senaria* and *Triarthrus becki,* on the spiral branches, exopodite and pygidial endopodites of *Triarthrus.*

Internal organs, alimentary canal, abdominal sheath, hepatic glands, heart, musculature.

Use of pygidium in swimming. Coxopodites and trails of Trilobites. *Isotelus maximus* Lock. Ordovician crustacean leg, &c.

Walter G. T. Upper Cambrian Trilobites.—Proc. Geol. Soc. Am., Vol. 32, No. 1, 1921, pp. 128-129.

The author remarks that as far as now known only three trilobites have been reported from the Upper Cambrian of Iowa, viz; *Dikelocephalus minnesotensis, Illaenurus quadratus* and a new species, *Illaenurus calvini.* These species are found in the Saint Lawrence limestone near Lansing, Iowa.

The first reference to *Illaenurus calvini* was in Geol. Sur., Vol. IV, p. 58. The species differs from *I. quadratus* in the presence of long postero-lateral extensions of the fixed cheeks.

Wedekind, Rud. Paläontologische Beiträge zur Geologie des Kellerwaldes.—Abhandl. der Königlich Preusschen Geol. Landesanstalt, N. F., Heft 69, 1914, pp. 83, pl. 5, Zweiter Theil. Trilobiten, pp. 23-82, pl. 1-5.

Die Phacopiden des Obersilurs im Kellerwalde.

A. Morphologie der Trilobiten mit besonderer Rücksicht auf die Phacopiden. Fig. 1-3, thorax segments; fig. 4, *Acaste brongniarti.*

B. Klassifikation der Phacopiden.

1. *Phacops* s. str. Gruppe des *Phacops latifrons* Bronn.
   Phacops fecundus, schlotheimi, breviceps, boecki, ferdinandi, munieri, douvillei, bufo, cacapona, rana.
2. *Trimerocephalus* McCoy, em. Wedekind.
   Trimerocephalus cryptophthalmus, granulatus, caecus, sulcatus, brevissimus, sp. drevermanni, anophthalmus.

(Gortani, 1907, places the genus under two subgenera, *Eutrimerocephalus* and *Microphthalmus.*)

3. *Reedia* gen. nov., Gruppe des *Phacops bronni.*
   Reedia cephalotes, sternbergi, bronni. fig. 5 and 6, *Reedia cephalotes* after Barrande.

Wedekind, Rud.—Continued.

4. *Glockeria* gen. nov. Gruppe des *Phacops glockeri* Barr. fig. 7 and 8; *Glockeria trapeziceps*, fig. 9; *Denckmannites volborthi*, fig. 10; *Trimerocephalus cryptophthalmus.*
Glockeria bulliceps, trapeziceps, glockeri.

C. Uebersicht über die Genera und Subgenera der Phacopiden.

I. Unterfamilie Dalmanitinae Reed.
- a. Subgenus *Dalamanitina* Reed.
- b. Subgenus *Hausmannia* Hall & Clarke.

2. Genus *Odontocephalus* Conrad.

3. Genus *Glockeria* Wedekind, 1911.
(McLearn, 1918, places this genus under *Phacopidella* Reed.)
- a. Subgenus *Glockeria* s. str.
- b. Subgenus *Denckmannites* Wedekind, 1913.

II. Unterfamilie Phacopidinae.

4. Genus *Acaste* Goldfuss, 1843, (referred to *Dalmanites* Reed.)
- a. Subgenus *Cryphaeus* Green, 1837, (referred to *Asteropyge* (Corda.)

5. Genus *Phacops* Emmrich.
- a. Subgenus *Phacops* s. str.
- b. Subjenus *Trimerocephalus* McCoy, 1849.
- c. Subgenus *Reedia* Wedekind, 1911.

D1. Unterscheidende Kennzeichen der Arten von *Phacops* s. str.

(a) 1. *Phacops pompeckji* sp. nov.; 2. *P. elegantulus* sp. nov.

(b) 1. *Phacops planilimbatus* sp. nov.; 2. *P. rubidus* sp. nov.; 3. *P. tetricus* sp. nov.

Der Basallobus.
Phacops fecundus ex *P. schlotheimi, latifrons.*

Die Augen, &c.

a. Auge mit Palpebralhügel.
1. *Phacops globosus* sp. nov.; 2. *P. fecundus communis* Barr.

b. Die Augen Mitte der Wagen.
1. Basalseitenloben geknotet, *P. denckmanni* sp. nov.
2. Basalseitenloben nicht geknotet, *P. rubidus* sp. nov.
3. Basallobus, glabellar-furchen, &c., *P. superstes, breviceps, intermedius, signatus, koeneni, batracheus.*

D2. Beschreibung der Arten von *Phacops* s. str.

(1) Gruppe des *Phacops pompeckji* Wedekind.

1. *P. pompeckji* sp. nvo., p. 42, pl. 1, fig. 68 and text fig. 12.
2. *P. elegantulus* sp. nov., p. 43, pl. 1, fig. 2 and text fig. 11.

(2) Gruppe des *Phacops breviceps* Barr.

(3) Gruppe des *Phacops fecundus* Barr. (var. *major*).

(4) Gruppe des *Phacops planilimbatus* Wedekind.

3. *P. planilimbatus* sp. nov., pl. 2, fig. 4 and text fig. 13.
4. *P. tetricus* sp. nov. p. 48, pl. 2, fig. 1.
5. *P. rubidus* sp. nov., p. 50, pl. 3, fig. 4 and text fig. 14.

(5) Gruppe des *Phacops globosus* Wedekind.

6. *P. globosus* sp. nov., p. 51,, pl. 2, fig. 3, text fig. 16.
7. *P. globosus* sp. nov., p. 51, pl. 2, fig. 3, text fig. 17.
8. *P. fecundus communis* Barr., pl. 2, fig. 5; pl. 3, fig. 3; pl. 4, fig. 1, text fig. 15.

(6) Gruppe des *Phacops primaevus* Clarke.

9. *P. durus* sp. nov., pl. 3, fig. 6, text fig. 19. p. 57.
10. *P. latus* sp. nov., p. 59, pl. 2, fig. 2, text fig. 18.

E. Unterscheidende Kennzeichen der Arten vom *Reedia* gen. nov. *R. glabella; R. zorgensis* Kays.; *R. cephalotes* Barr.

Die Augen, &c.

a. *Reedia sternbergi.*

b. Basalseitenloben: *R. clarki* sp. nov.

c. Glabella von Griefumschlagform: (a) Koptschild, *R. walcotti* sp. nov.; (b) Kopfchild lang und schmal. *R. steinhornensis* sp. nov.

Augen klein und flach, &c.: (a) Glabella am vorderrande breit und kurz gerundet; (b) Basallobus vorn und hinter, breite Furchen, &c.

a. Basis der Glabella unverhältnissmässig schmal, *Reedia friederici* sp. nov.

b. Basis der Glabella breit, Kopfschild nur wenig breiter als lang, *R. bronni.*

Kopfschild kurz und breit, *R. holmi* sp. nov.

a. Basallobus seitwarts unverkürzt, Basalseitenloben ungeknotet, *R. primaeva* sp. nov.

b. Glabella von Briefumschlagform, *R. acuticeps* Kays.

F. Beschreibung der Arten von *Reedia* gen nov.

(7) Gruppe des *Phacops* (*Reedia*) *sephalotes* Barr., p. 71.

11. *Reedia lotzi* sp. nov., p. 61, ul. 5, fig. 2.

(8) Gruppe des *Phacops* (*Reedia*) *bronni* Barr., p. 62.

12. *Reedia primaeva* sp. nov., p. 62, pl. 3, fig. 5.
13. *Reedia friederici* sp. nov., pl. 3, fig. 2; pl. 4, fig. 3, text fig. 20 21.
14. *Reedia holmi* sp. nov., pl. 5, fig. 3.

(9) Gruppe des *Pacops* (*Reedia*) *steinhornensis* sp. nov.

15. *Reedia steinhornensis* sp. nov., pl. 4, fig. 4, text fig. 24.
16. *Reedia walcotti* sp. nov., p. 69, pl. 3, fig. 1, text fig. 22 and 25.
17. *Reedia clarkei* sp. nov., pl. 4; fig. 2, text fig. 23 and 26.

Anhang, Phacopiden, Pygidien, p. 71.

18. *Phacops sp.* 1.
19. *Phacops sp.* 2.
20 *Phacops sp.* 3, p. 72.

G. Genus *Acaste* Goldfuss; Subgenus *Cryphaeus* Green.

H. Genus *Dalmanites* Barr.

21. *Hausmannia sp.* 1.
22. *Hausmannia sp.* 2.
23. *Hausmannia sp.* 3.
24. *Hausmannia sp.* 4, p. 74.

Die Bronteiden, Lichaden, Proetiden und Harpiden aus dem Obersilur des Kellerwaldes, p. 75.

(1) Gruppe des *Bronteus planus* Corda, p. 75.

(2) Gruppe des *Bronteus umbellifer* Beyr., p. 75.

a. Genus *Bronteus.*

25. *Bronteus* sp. nov.

b. Genus *Lichas.*

26. *Lichas* (*Euarges*) *pusillus* Ang., p. 77.

c. Genus *Cheirurus* Beyr.

27. *Cheirurus sternbergi* Boeck.

d. Genus *Acidaspis.*

28. *Acidaspis* cf. *minuta Barr.*, p. 79.

e. Genus *Proetus.*

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29. *Proetus obscurus* sp. nov., p. 79.

f. Genus *Cyphaspis* Burm.

30. *Cyphaspis* cf. *halli* Barr., p. 81.

31. *Cyphaspis sp.*, p. 87.

g. Genus *Harpes*.

32. *Harpes koeneni* sp. nov., p. 81, pl. 4, fig. 5.

New Subgenera.

Denckmannites gen. nov.; Gruppe de *Phacops volborthi* Barr.

Das halbkreisförmige Kopfschild wird von einem Limbus ganzlich umrande, Die einzelnen Abschnitte des Kopfschildes, Glabella und Wangen sind schwach gewölbt. Vom vorderrande des Kopfschildes steigt die Glabella in nur schwacher Wölbung an, ohne überstulpt zu sein. Die vordere und mittlere Glabellar-furchen sind nur schwach ausgebildet, während die dritte um ein Drittel der Glabellabreite tief in die Glabella einschneidet, ohne in der Mitte mit der anderseitigen zusammenzustossen.

Die minimal kleinen Augen erheben sich nicht ueber das Niveau der Wanen.

Gruppe des *Phacops* (*Reedia*) *cephalotes*.

Die Glabella ist relativ stark gewölbt und ängewöhnlich stark in Form einer dreieckigen Schnauze über den Frontallimbus vergestülpt.

Der Basallobus ist rudimentär und besteht nur aus einer schmalen Leiste. Hierher rechne ich drei mir aus eigener Anschaung bekannte Arten, nämlich *Reedia cephalotes* Barr., *Reedia lotzi* sp. nov., und *Reedia zorgensis* Kays. Die beiden ersten Arten sind dadurch von einander unterschieden, dass bei *Reedia cephalotes* Barr., die Augen sehr lang sind und fast bis zur Pleurocipitalfurche reichen dass sie bei *lotzi* sp. nov. dagegen nicht über die Mitte der Wangen hinausreichen, *Reedia zorgensis* Kays. unterscheidet sich von beiden durch spitze.

Form der Galbella.

Gruppe des *Phacops* (*Reedia*) *bronni* Barr.

Das Kopfschild ist in den Wangentheilen stark abwärts gekrümmt. Im Gegensatz zu den Formen der Gruppe der *Reedia cephalotes* Barr., ist die Glabella bei den Formen der Gruppe der *Reedia bronni* Barr., flach und nicht oder doch nur immer sehr wenig über den Frontallimbus des Kopfschildes vorgestülpt. Der Vorderrand des Kopfschildes ist gerundet; die Augen sind durchweg klein, flach und von geringer Länge. Die meisten der hierher gehörigen, mir bekannt gewordenen Formen eustammen dem Obersilur des Kellerwaldes, *Reedia primaeva, Reedia friederici,* und *Reedia holmi. Reedia friederici* steht entschieden dem *Phacops bronni* Barr. sehr nahe.,

Gruppe des *Phacops* (*Reedia*) *steinhornensis* sp. nov.

Das gesammte Kopfschild ist relativ flach, ebenso die Glabella, deren vordere Begrenzung meist dreieckig ist. Dabei ist sie stark über den Frontallimbus vorgestülpt. Der Basallobus bildt einen nur wenig verschmälerten zusammenhägenden Ring.

Heir schliesse ich anhangsweise auch *Reedia clarkei* an bei der Basallobus fast ganz rudimentär ist.

————Klassifikation der Phacopiden.—Zeitschr. der Deutsch Geol., Bd. 63, 1911, pp. 317-336, pl. 15, 16.

The author divides the Phacopidae into six groups.

Group 1. *Phacops fecundus* Barr., *Phacops* s. str., p. 317, pl. 15, fig. 1-4 and 6, text fig. 1.

Group 2. *Trimerocephalus* McCoy, *T. cryptophthalmus* Emmrich, equals *laevis*.

Group 3. *Phacops bronni,* equals *Reedia* gen. nov., p. 322, fig. 2.

The author places under the new genus *Reedia cephalotes* (Corda), *R. sternbergi* (Corda), and *Reedia bronni* (Barr.)

Group 4. *Phacops glockeri,* equals *Glockeria* gen. nov., p. 323.

The new genus is proposed for a group similar to *Phacopidella* Reed, 1905, which has priority over *Glockeria.*

The author places three species under his new genus, *Glockeria trapeziceps* (Barr.), *G. bulliceps* (Barr.), *G. glockeri* (Barr.)

Group 5. *Phacops volborthi* Barr. equals *Denckmannia* gen. nov., p. 323.

The author includes three species under *Denckmannia, D. volborthi* (Barr.), *D. miser* (Barr.), *D. fugitivus* (Barr.)

Group 6. *Pterygometopidella* subgen. nov., p. 324.

P. quadrillineata (Ang.), pl. 15, fig. 9.

WESTERGARD, A. H. Studier öfver Dictyograptusskiffern och des Gränslager med Särskild, Hänsyn till Skåne Förekommande Bildnigar.—Lunds Geologiska Fältklubb, Ser. B, No. 4, 1909.

Fossil från acerocarenzonen.

Agnostus sp., p. 67, pl. 1, fig. 1.

Peltura corniger sp. nov., p. 48, pl. 1, fig. 2-4.

Parabolina heros Brögg., p. 48, pl. 1, fig. 5-8.

Boeckia? illaenopsis sp. nov., p. 49, pl. 1, fig. 14-15, 18, samt sannolikt 16, 17; *B. scanica* sp. nov., p. 50, pl. 1, fig. 9-13.

Euloma primordiale sp. nov., p. 51, pl. 1, fig. 21, 22.

Niobe primaeva sp. nov., p. 52, pl. 1, fig. 23. 24.

Megalaspis sp., p. 53, pl. 1, fig. 25; *M. sp.,* p. 54, pl. 1, fig. 26, 27.

Fossils från Dictyograptusskiffern & Oboluslagren.

Hysterolenus törnquisti Moberg, p. 54, pl. 2, g. 1-4; *H.? levicauda* Moberg, p. 58, pl. 1, fig. 5.

Boeckia mobergi Wiman, p. 55, pl. 2, fig. 6-9.

Acerocare sp., p. 55.

————Notiser Börande *Dictyograptus* Skiffern.—Geol. Förens. Förhandl., Bd. 39, 1917, pp. 635-644, plates 7.

Boeckia mobergi Wiman, p. 637, pl. 7, fig. 1-9.

Parabolinella wimani sp. nov., p. 639, pl. 7, fig. 10-17.

This new species takes the place of *Acerocare?* Wiman, Palaeont. Notizen 3-6, p. 82, pl. 5, fig. 15, and *Boeckia mobergi* Wiman, idem, p. 81, pl. 5, fig. 10.

————Sveriges Olenidskiffer.—Utbrening och Lagerföljd. 2 Fauna i Trilobita, pp. 115-205, plates 1-16, 1922.

Agnostus pisiformis (Linné), p. 115, pl. 1, fig. 1-3; *A. pisiformis obesus* Belt, p. 116, pl. 1, fig. 4a, b, (5, 6, ?); *A. cyclopyge* Tullberg, p. 116, pl. 1, fig. 7, 8; *A. reticulatus* Ang., p. 117, pl. 1, fig. 9, 10; *A. trisectus* Salter, p. 117, p. 1, fig. 11, 12; *A. rudis* Salter, p. 118, pl. 1, fig. 17; *A. rudis holmi* var. nov., p. 118, pl. 1, fig. 13-16.

Differs from the British *A. rudis* in greater convexity of the cephalon and a narrower margin of the tail. Compared with the Swedish form referred to this species, the tail has, moreover, a wider and longer axis.

Agnostus sp., p. 119, pl. 1, fig. 18.

Schmalenseeia amphionura Moberg, p. 119, pl. 1, fig. 19.

General form depressed, ovate; thorax seven segments; pygidium axis seven rings including the terminal portion.

Proceratopyge nathorsti sp. nov., p. 120, pl. 2, fig. 3-5.

Pygidium only known. Pygidium large, semicircular, with one pair of strong marginal spines; axis narrower than the lateral lobes, conical, divided by shallow, transverse furrows into three rings, and an elongated terminal portion, not reaching the margin; lateral lobes, with broad, flat limb, moderately convex; two pairs of distinct, and a third pair of indistinct grooves.

Westergard, A. H.—Continued.

Proceratopyge tullbergi sp. nov., p. 121, pl. 2, fig. 6, 7.

Differs from the pygidium of *P. nathorsti* in having a longer axis of six to seven rings in addition to the terminal portion, and a narrower, slightly arched marginal limb.

Liostracus pusillus sp. nov., p. 121, pl. 2, fig. 8-19.

Small form. Cephalon semicircular; genal angles pointed or spined; border rim wide, rather flat, separated by a narrow and shallow furrow; glabella wide, conical, almost truncate in front, not reaching to the intermarginal furrow; glabellar furrows three to four pairs in adult specimens, faintly marked, occipital furrow strong, curving forward at the axial line; occipital ring smooth?; palpebral lobe of moderate size, placed in the middle of the cheeks and at a distance from the glabella; palpebral ridges distinct, transverse; facial suture running backward and inward from the anterior margin to the eyes, thence outward and backward, cutting the posterior margin close to the genal angles; free cheeks narrow; thorax ten segments; axis convex; pleurae obliquely grooved, in their extremities sloping downward, probably pointed.

Pygidium of young specimens with rounded and entire margin; axis conical, reaching nearly to the margin, five to six rings; lateral lobe with four to five pairs of pleural grooves.

Liostracus (?) *superstes* Linnarsson, p. 122, pl. 2, fig. 20.

Conokephalina olenorum sp. nov., p. 122, pl. 1, fig. 22-26, (27 & 28?).

Cephalon semicircular; genal angles with long, curved spines; margin rim broad, flat; glabella subcylindrical, slightly tapering toward the front, not reaching to the intermarginal furrow; glabellar furrows indistinct; palperbral lobes curved, reaching in front and behind nearly to the glabella, and posteriorly to the occipital furrow; facial suture running inward, and backward from the anterior margin of the eye, thence outward; fixed cheeks narrow, forming a pointed, very small lobe behind the eye; free cheeks rather broad, aperture of eye large. A fragment of a thorax segment has grooved pleurae produced into a long, backward-directed spine.

Acrocephalites stenometopus (Ang.), p. 123, pl. 1, fig. 20, 21a-c.

Acrocephalites? rarus sp. nov., p. 123, fig. in text No. 39.

Fragment of cranidium.

Glabella rather convex, three pairs of shallow glabellar furrows, front limb in front of the glabella rather flat; fixed cheek swollen between the eye and the glabella and having a broad concavity running from the anterior part of the palpebral lobe to the anterior angle of the glabella; ocular ridge lacking; facial suture behind the eye directed outward and backward (half way from the eye, inward and backward). Test probably smooth.

Olenus gibbosus Wahl., p. 123, pl. 3, fig. 1-10; *O. transversus* Linrs., p. 125, pl. 3, fig. 11-17, (pl. 5, fig. 16, 17?); *O. truncatus* (Brün), p. 126, pl. 3, fig. 18, 19; pl. 5, fig. 1-4; *O. wahlenbergi* sp. nov., p. 128, pl. 4, fig. 5-14, the *Entm. gibbosus* Wahl. (pars), p. 39, pl. 1, fig. 4.

General form (exclusive of the free cheeks) elongated, subelliptical; glabella subrectangular, short, separated from the anterior marginal rim by a frontal limb of about a qaurter its own length; free cheeks broad, with large aperture of the eye; spine slightly deviating from the direct continuation of the external margin, and directed somewhat outward; thorax with fifteen to sixteen segments; axis convex, forming nearly one-third the total width in the anterior segment, and more than one-third the posterior segment; pleurae horizontal near the tips, bent downward, the first two pointed, the following ones produced into short spines which are longest on segments eight to ten.

Pygidium triangular; axis broad, conical, obtuse, reaching (nearly) to the margin, composed of five to six segments; lateral lobes far narrower than the axis, with two or three pairs of grooves, the ribs marked by a fine, intermediate line; margin entire.

Olenus attenuatus (Boeck), p. 128, pl. 4, fig. 15-19; pl. 5, fig. 1-9.

Olenus dentatus sp. nov., p. 130, pl. 5, fig. 10-15.

Glabella approximately as broad as the fixed cheek at the posterior margin and separated from the anterior marginal rim by a frontal limb one-fifth to one-sixth of its length; palpebral lobes of moderate size, placed a little nearer to the anterior than posterior margin, and set at a distance from the glabella less than one-half the width of the latter; free cheeks of moderate width, the spine and posterior margin forming a right angle.

Thorax with twelve sebments; axis occupying one-third the total width; pleurae bent downward in the outer portion, grooved, ending in short spines.

Pygidium small, rounded in outline; rim narrow, with one pair of short spines; axis broader than the lateral lobes, strongly conical, not reaching to the margin, and consisting of three or four segments (including the terminal one); lateral lobes somewhat arched, with two pairs of groves, ribs with fine intermediate lines.

Olenus scanicus sp. nov., p. 131, pl. 6, fig. 6-8.

Cephalon like that of *O. rotundatus,* but differs in having smaller, and more anteriorly placed palpebral lobes.

Pygidium small, semicircular; axis with three rings (including the terminal one), conical, not reaching to the margin; lateral lobes with two pairs of backward-curved grooves, three pairs of border spines, the posterior pair rudimentary; marginal rim wanting.

Olenus rotundatus sp. nov., p. 131, pl. 6, fig. 1-5.

Cranidium: glabella subrectangular, forming one-fourth of the width of the cranidium at the posterior border; frontal limb at the axial line less than one-half the glabella in front; palpebral lobes rather small, placed somewhat forward and distant from the glabella, a little more than half the width of the latter.

Thorax segments unknown; axis forming less than one-third, and in the posterior segments about one-third of the total width, each ring bearing a median tubercle; pleurae bent somewhat downward in the front segments, horizontal in the posterior segments.

Pygidium semicircular, axis one-third of total width, conical, obtuse, composed of five or six segments, not extending to the border.

Lateral lobes with three or four pairs of backward curved grooves; border forming a narrow, raised rim with one pair of small spines.

Olenus sp., p. 132, pl. 6, fig. 25.

Parabolina brevispina sp. nov., p. 133, pl. 6, fig. 9-13.

Form depressed, elongate, ovate, the width of the thorax less than one-half the total length; glabella forming one-half the width of the cranidium at the posterior margin, narrowing towards the front, and reaching forward nearly to the border; occipital ring bearing an elongated median tubercle.

Thorax with twelve segments; axis one-half the total width, bearing a row of median tubercles; pleurae ending in short spines.

Pygidium small, composed of three segments with two pairs of short spines.

Parabolina spinulosa (Wahl.), p. 134, pl. 6, fig. 14-20.

Parabolina mobergi sp. nov., p. 135, pl. 6, fig. 21-24.

Cranidium trapezohedral, length one-half the width; glabella subcylindrical, with rounded anterior angles, not reaching the margin; glabellar furrows three pairs, the anterior short and faintly marked, the posterior meeting across the glabella; occipital ring with a strong, backward-directed spine; palpebral lobes rather small, at a distance from the glabella of a little more than one-half the width of the latter; palpebral ridges straight, running at right angles to the axis; facial suture curving backward from the anterior margin to the eye, thence outward and backward to the posterior border, which it cuts some distance within the genal angle; free cheeks broad; genal angles long and broad, deviating slightly from the direct continuation of the external marginal rim.

Pygidium semicircular; axis slightly conical, with five rings (including the terminal portion), reaching to the marginal rim; lateral lobes slightly arched, with three to four pairs of grooves, the ribs with fine intermediate lines;

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border forming a very narrow rim with three pairs of short spines, the last rudimentary.

Parabolina longicornis sp. nov., p. 136, pl. 7, fig. 1-8.

Form rather depressed, ovate; glabella tapering slightly forward, truncate orbroadly rounded in front; glabellar furrows three pairs; occipital ring with median tubercle or spine; fixed cheeks behind the eyes expanded and wider than the glabella; palpebral lobes moderate, placed in the middle of the cheek, distant from the glabella by one-half the width of the latter; palpebral ridges distinct, transverse or slightly oblique; frontal limb varying somewhat in breadth in front of the glabella; facial suture behind the eye running nearly at right angles to the axis, finally curving backward; eyes large; genal spines long and slender.

Thorax of twelve segments; axis one-fourth the width, each ring bearing a median tubercle; pleurae at their extremities bent slightly downward, ending in spines, the spines of the eighth segment being very long; pleural grooves continued in the base of the spines.

Pygidium broad and short, rounded in outline, with a flat and rather broad marginal rim, and three pairs of broad, short spines directed backward and inward; axis narrow, somewhat conical, blunt, reaching nearly to the rim; lateral lobes with three pairs of grooves.

Parabolina acanthura (Ang.), p. 137, pl. 7, fig. 9-16, p. 198, same figures; *P. megalops* Moberg & Möller, p. 137, pl. 7, fig. 17-23; *P. heros* Brögg., p. 137, pl. 7, fig. 24-34.

Parabolina jemtlandica sp. nov., p. 138, pl. 7, fig. 35-38.

Fragments only.

Cranidium moderately arched, somewhat convex in front; glabella slightly conical, rounded in front; glabellar furrows three pairs, not meeting in the dorsal furrow; occipital ring with median tubercle; fixed cheek, at the posterior margin, equal in width to the glabella, half that width at the eye; palpebral lobes small, placed far forward; palpebral ridges transverse; frontal limb at the axial line somewhat broader than the frontal rim; genal angles strong and straight, in direct continuation of the outer margin.

Thorax with median tubercle and deeply grooved pleaurae, which, at their extremities, are bent somewhat downward and end in spines.

Pygidium semicircular, axis forming about one-third the whole width, somewhat conical, blunt, not reaching the margin, having three rings, the two anterior bearing a median tubercle, the third confluent with the terminal portion; lateral lobes with three pairs of faintly marked grooves, the ribs with intermediate lines; marginal spines four, the last rudimentary and placed behind the axis.

Parabolinella laticauda sp. nov., p. 139, pl. 8, fig. 1-7.

Cephalon semicircular, moderately arched, margin formed by a narrow, raised rim; glabella subrectangular, slightly tapering forward, broadly rounded in front, separated from the frontal rim by a broad frontal limb; oblique glabellar furrows three pairs, the anterior indistinct, all obsolete at the dorsal furrows, and not reaching to the axial line; dorsal furrows at the side of the glabella distinct and faintly marked in front of it; facial suture curved from the anterior margin backward and slightly inward to the eye, thence outward and backward, cutting the posterior margin somewhat more than one-half way out. In some thorax segments the axis is narrower than the pleurae, each ring bearing a small median tubercle; pleurae bent slightly downward one-half way out from the dorsal furrows, grooved, ending in short spines.

Pygidium broad, short, rounded in outline or somewhat truncate behind the axis; axis forming less than one-third the total width, slightly conical, blunt, reaching to the marginal rim, and having two rings besides the terminal portion; lateral lobes marked by three grooves, the ribs with a fine intermediate line; border forming a flat rim without spines.

Beltella solitaria sp. nov., pl. 14, fig. 1, 2.

From a flattened internal cast.

Cephalon semicircular, border forming a rather flat rim, genal angles produced into backward-directed and outward-curved spines; glabella slightly conical, broadly rounded in front, with two to three pairs of faintly marked glabellar furrows, the last meeting the axial line; occipital furrow distinct; occipital ring with a small tubercle; fixed cheek at the posterior margin narrower than the glabella; palpebral lobes small, placed far forward; palpebral ridge indistinct; frontal limb at the axial line as broad as at the marginal rim; facial sture at the front of the eye directed forward and outward.

Thorax with twelve segments, decreasing in width from the sixth; axis forming more than one-third of the total width in the anterior segments and about one-third of the total width in the posterior segments; pleurae half way out bent downward and ending in broad, short spines.

Pygidium with three pairs of border spines.

Leptoplastus raphidophorus Angelin, p. 143, pl. 8, fig. 13-17; pl. 10, fig. 2, 3; *L. ovatus* Ang., p. 145, pl. 8, fig. 18-21.

Leptoplastus minor sp. nov., p. 144, pl. 8, fig. 25-29; fragments only known. Distinguished from *L. raphidophorus* by the shortness of the genal spines and smaller size.

Leptoplastus paucisegmentatus sp. nov., p. 146, pl. 8, fig. 22, (23, 24?).

Related to *L. ovatus*. It differs in having nine thoracic segments and the free cheek referred doubtfully to it being narrower and longer than in the latter species.

Leptoplastus stenotus Angelin, p. 146, pl. 9, fig. 1-6; *L. claudicans* (Moberg & Möller), p. 147, pl. 8, fig. 8-12.

Eurycare latum (Boeck), p. 148, pl. 9, fig. 7-10; *E. brevicauda* Ang., p. 148, pl. 9, fig. 11, 12.

Eurycare spinigerum sp. nov., p. 149, pl. 9, fig. 13, 14; pl. 10, fig. 1.

Cranidium resembling that of *E. brevicauda*.

Thorax having twelve segments, the axis ring of the eleventh segment sending out a long spine, the other rings smooth or bearing very faint tubercles.

Surycare angustatum Ang., p. 150, pl. 10, fig. 4-9.

Ctenopyge neglecta sp. nov., p. 150, pl. 10, fig. 10-18.

Glabella forming less than one-third the width of the cranidium at the posterior border, tapering slightly forward, and not reaching to the intermarginal furrow; glabellar furrows three pairs, faint, oblique, the anterior indistinct, the posterior reaching nearly, if not quite to the axial line; occipital ring with median spine; palpebral lobes moderate, placed at an equal distance from the anterior and posterior border and the glabella; palpebral ridges distinct, very slightly oblique, frontal limb varying in breadth from one-half to twice the width of the arched frontal rim; facial sutures meeting in a point at the axial line on the upper surface of the broad frontal rim; free cheeks wide, arched, bent slightly upward at the genal angles, ornamented with branching and anastomosing ridges which radiate from the eyes, long and broad, curved inward and, at their extremities, downward.

Thorax with at least ten segments, axis in the anterior and middle segments narrower than the pleurae, each axial ring bearing a median spine which, in the anterior segment is short, in the ninth and tenth segments very long; pleurae horizintal, bent slightly downward near the tips, produced in slender curved spines which are shorter in the first segments, but in the following segments seem to be as long as, or longer, than the width of the pleurae.

Pygidium, doubtfully referred, very small and semicircular; axis broad, consisting of two rings and the terminal portions; lateral lobes with two pairs of rudimentary spines.

Ctenopyge flagelifera (Angelin), p. 152, pl. 10, fig. 19-23; pl. 11, fig. 1.

Ctenopyge flagellifera angusta var. nov., p. 153, pl. 11, fig. 2-8.

Differs from the typical form in having the dorsal shield proportionally narrower, the axis broader, more backward placed, the cheek spines less curved.

Ctenopyge spectabilis Brögger, p. 154, pl. 11, fig. 9-14.

Ctenopyge tumida sp. nov., p. 155, pl. 11, fig. 15-20.

Westergard, A. H.—Continued.

Ctenopyge? sp. indet. Linnarsson, 1880, pl. 6, fig. 15.

Cranidium slightly emarginate in front, frontal border forming a narrow, raised rim; glabella somewhat conical, rather truncate in front, with three pairs of glabellar furrows, the first obsolete, the last usually meeting across the glabella, but shallow towards the axial line; occipital ring with a small median spine; fixed cheeks arched, much wider than the glabella at their posterior border; palpebral lobes moderate, placed a very little nearer to the anterior than to the posterior margin, and at a distance from the glabella somewhat less than the width of the latter; palpebral ridges transverse or slightly obique; facial suture directed outward behind the eye, cuting the border at some distance in front of the rounded posterior angle; free cheeks small, sloping gently from the eye to the margin, angulate in outline, spine broad and long, placed backward.

Number of segments of the thorax unknown; axis a little wider than the pleurae, each ring bearing a median spine; pleurae in the outer, anterior portion swollen, produced into long, slender, curved spines, the spines of the first segment being especially long and strongly curved.

Pygidium unknown.

Ctenopyge erecta sp. nov., p. 156, pl. 11, fig. 21-27.

Fragments.

Cranidium broad, its width two and a half times its length, emarginate in front; frontal rim strongly erect; glabella narrow, forming one-fifth of the total width of the cranidium at the posterior border, subcylindrical, reaching nearly, if not quite, to the marginal furrow; glabellar furrows two to three pairs, the anterior two of which are obsolete, the last meeting across the glabella, but very faint towards the axial line; palpebral lobes placed a very little nearer to the posterior than the anterior margin, and at a distance from the glabella equal to the width of the latter; palpebral ridges oblique; facial suture behind the eye running at right angles to the axis; free cheeks broad, with faint vascular markings radiating from the eye, margin uniformly curved; eyes large, semispherical; cheek spines slender, slightly curved, placed backward; the associated hypostoma lingulate, posteriorly somewhat expanded.

Thorax wider than the cephalon, number of segments unknown; axis forming less than one-fifth of the whole width, probably bearing (in the first anterior segment) a row of median tubercles; pleurae straight, horizontal, bent slightly downward at the tips, deeply grooved, produced into spines which, in the anterior segments, are short.

Pygidium unknown.

Ctenopyge affinis sp. nov., p. 157, pl. 12, fig. 1-14, (15?).

This species agrees most nearly with *C. bisulcatus.*

The free cheek, with its angular outline, backward-placed and not very curved spine, and the shape of the fixed cheek, which is nearly horizontal and acute at the posterior border, have impelled the author to make a separate species.

Ctenopyge oelandica sp. nov., p. 158, pl. 12, fig. 18.

Fragment.

Nearly related to *C. directa,* from which it is distinguished in having a straight front, the eyes placed near to the posterior border, with very oblique palpebral ridges.

Ctenopyge directa Lake, p. 158, pl. 12, fig. 16, (17?); *C. bisulcata* (Phillips), p. 159, pl. 12, fig. 19-25; *C. teretifrons* (Angelin) p. 162, pl. 13, fig. 6, (7, 9.?); *C. pecten* Salter p. 160, pl. 12, fig. 26-33; pl. 13, fig. 1.

Ctenopyge linnarssoni sp. nov., p. 162, pl. 13, fig. 2-5.

Cranidium.

Nearly related to *Ctenopyge teretifrons* but differs in having the glabella slightly tapering towards the front and the fixed cheeks narrower.

Sphaerophthalmus major Lake, p. 163, pl. 13, fig. 9-18, (19?); *S. alatus*

(Boeck), p. 165, pl. 13, fig. 20-29; *S. majusculus* Linnarsson, p. 166, pl. 13, fig. 30-35.

Peltura scarabaeoides (Wahl.), p. 168, pl. 15, fig. 2.

Protopeltura praecursor (Westergärd), *P. acanthura* Brögger.

Dorsal shield moderately arched.

Cephalon semicircular, genal angles angulate and produced into spines which are nearly, if not quite, direct continuations of the external margin; glabella moderately broad, not reaching to the frontal rim; eyes small, rather close to the glabella and frontal border; palpebral ridges distinct.

Axis of the thorax slightly conical, about equal in width to the pleurae; pleurae produced into spines.

Pygidium small, wide, entire or dentated.

Acerocare ecorne Angelin, p. 168.

Cyclognathus micropygus Linrs., p. 169.

Protopeltura aciculata (Angelin), p. 169, pl. 14, fig. 3-12, (13?); *P. aciculata pusilla* var. nov., p. 171, pl. 14, fig. 14-17.

A small form distinguished from *P. aciculata* by its subrectangular glabella, wider free cheeks, wider, and somewhat triangular pygidium.

Protopeltura intermedia sp. nov., p. 171, pl. 14, fig. 18-22.

Cranidium, free cheek and pygidium known.

Glabella forming nearly one-half the width of the cranidium at the posterior border, rounded anteriorly, with two pairs of distinct glabellar furrows; occipital ring bearing a slightly developed median tubercle; frontal limb somewhat narrower than the frontal rim; palpebral lobes placed close to the glabella.

Pygidium small, broadly semicircular; axis one-third the whole width, with two rings and the terminal portion not extending to the border; lateral lobes arched, with two pairs of grooves; border forming a narrow, flat, entire rim, which is somewhat elevated towards the median line.

Protopeltura praecursor (Westergärd), p. 171, pl. 14, fig. 23-29, (30?); pl. 15, fig. 1.

Peltura scarabaeoides acutidens Brögger, p. 175, pl. 15, fig. 14-17.

Peltura minor (Brögger), p. 175, pl. 15, fig. 3-11.

Peltura cornigera Westergärd, p. 176, pl. 15, fig. 15, 19-23.

Glabella extending nearly, if not quite, to the very faintly marked frontal rim; glabellar furrows obsolete; occipital furrow shallow; occipital ring broad and flat, with a very slightly developed median tubercle; palpebral ridges indistinct; facial suture curved strongly inward near the posterior border; free cheek narrow, bearing a short spine, which is set far back and projects at right angles to the margin.

Thorax segments unknown; axis strongly convex, bearing a row of very faint median tubercles; pleurae strongly arched, with fulcrum close to the dorsal furrow and terminating in very short spines.

Pygidium semi-circular; axis occupying a little more than one-third of the width and composed of two distinctly separate rings and the terminal portion, extending to the marginal rim; lateral lobes arched, with two pairs of well marked grooves; border forming a narrow, rather flat rim with three pairs of small, blunt spines.

Peltura paradoxa (Moberg & Möller), p. 177, pl. 16, fig. 1-4, 5?; *P. coltata* (Brögger)? p. 177, (*Cyclognathus costatus* Bögg.).

Acerocare ecorne Angelin, p. 178, pl. 16, fig. 6-14; *A. tullbergi* Moberg & Möller, p. 178, pl. 16, fig. 15-18.

Cyclognathus micropygus Linrs., p. 178, pl. 16, fig. 19-25; *C. granulatus* (Moberg & Möller), p. 179, pl. 16, fig. 26-32, the *Acerocare granulatum* (pars) Moberg & Möller, 1898, pl. XI, fig. 1-9 (e) & pl. 14, fig. 1-5.

Boeckia scanica Westergard, p. 179, pl. 16, fig. 40-43; *B.? illaenopsis* Westergärd, p. 179, pl. 16, fig. 33-39.

Euloma primordiale Westergärd, p. 180, pl. 2, fig. 21, 22.

Westergard, A. H.—Continued.

Only fragment known.

Niobe primaeva Westergärd, p. 180, pl. 2, fig. 23, (24, 25, 26?).

Some rare fragments of Asaphidae, the oldest of this family from Sweden, are found in the *Acerocare zone* in Scania, and in the *Parabolina longicornis* sub-zone at Kinnekulle Hill (Westergötland). Two cranidia seem to belong to *Niobe;* two hypostomata to *Megalaspis,* the generic reference of the other fragments being doubtful.

Orusia lenticularis; Zone 3, *Parabolina spinulosa* & *Orusia lenticularis,* p. 182, (the *Orthis lenticularis* Wahl.), has a special brachiopod facies. It occurs, however, very often together with *Parabolina spinulosa,* especially in the shales.

Notes:

The species mentioned by Brögger under the name *Protopeltura acanthura,* and occurring in Norway at the bottom of the *Peltura* zone, is not, as was believed, identical with the Swedish *Praabolina acanthura,* but a new species to which Westergärd gave the name *Peltura praecursor* in 1909.

The species quoted by Brögger from the Norwegian *Ceratopyge* limestone under the name *Cyclognathus micropygus* is not the same as Linnarsson's species, but quite a new species which Moberg & Möller have named *Acerocare norvegicum.*

(Moberg, Hist. Stratigraphical Review of the Silurian of Sweden, p. 172.)

Wilson, Alice E. & Mather, Kirtley, F. Synopsis of the Common Fossils of the Kingston Area.—25th Ann. Rep., Ontario Bur. of Mines, 1916, pp. 45-66, pl. 1-3.

Synoptic List of the Black River species.

Crustacea:

Bathyurus sp. Ulrich; *B. extans* (Hall); *B. springer* Hall.

Bumastus milleri (Billings); *Ceraurus pleurexanthemus* Green; *Illaenus sp.; Isotelus gigas* DeKay; *Onchometopus simplex* R. & N.; *Pterygometopus sp.*

Ostracoda:

Aparchites sp.; Eurychilina sp.; Isochilina subarmata Ul.; *Leperditella* cf. *nundala* Ulrich; *L. tumida* Ul.; *L. fabulites* (Conrad).

Key to Black River Fossils.

Trilobites:

Descriptions of the above listed genera and species.

Ostracoda:

Descriptions of the above listed genera and species.

Synoptic list of Trenton Possils.

Trilobites:

Isotelus gigas DeKay; *Bumastus* sp.; *Calymene senaria* Conrad; *Ceraurus dentatus* R. & N.; *C. pleurexanthemus* Green.

Descriptive Key of Trenton Fossils.

Trilobites:

Order Opisthoparia.

Fam. Asaphidae: *Isotelus, Isotelus gigas* DeKay.

Fam. Illaenidae: *Bumastus, B. billingsi* R. & N.; *B. bellevillensis* R. & N.

Order Proparia.

Fam. Calymenidae, *Calymene senaria* Conrad.

Fam. Cheiruridae, *Cheirurus pleurexanthemus* Green; *C. dentatus* R. & N.

Wiman, Carl. Palaeontologische Notizen, 3-6.—Bull. Geol. Inst. of Upsala, No. 11, Vol. 6, Part 1, 1902, pp. 77-83, pl. 3.

3. Ueber *Robergia microphthalma* Linrs. und *Triarthrus jemtlandicus* Linrs.

4. *Paradoxides jemtlandicus* sp. nov.

5. Ein neuer Trilobit in Dicyomemaschiefer, *Boeckia mobergi* sp. nov. (Referred by Westergärd in 1917 to *Parabolinella wimani*, p. 81, pl. 5, fig. 9, 11-14, (e) 10/1.)

————Palaeontologische Notizen, 7-12.—Bull. Geol. Inst. of Upsala, Vol. 7, 1905, pp. 287-296, pl. 29-30.

7. Uber das Exsulans lager auf Oland.

Paradoxides tessini Brong.; *Ellipsocephalus muticus* Ang.

8. *Diaphanometopus lincatus* Ang.

9. *Pliomera linnarssoni* sp. nov.

10. *Ueber Holometopus* Angelin.

11. *Anomocare excavatum* Ang.

12. Ein Problematicum.

————Ueber die Fauna des Westbaltischen Leptaenakalks.—Arkiv. för Zoologi, Bd. 3, No. 24, 1907, pp. 20, pl. 2.

Die Fauna Trilobiten.

Cheirurus tenuispinus Törnquist.

Pseudosphaerexochus conformis Ang.; *P.* sp.

Deiphon punctatus Ang.

Acidaspis sp.

Calymene sp.

Procyus sp.

Illaenus sp.

Ampyx sp.

Dicellocephalus? leptaenarum sp. nov.

————Iakttagelser pä *Nilus armadillo* Dalman.—Geol. Fören. Förhandl., No. 225, Bd. 26, Häft 1, p. 87, 5 fig. in text.

WOODS, HENRY. The Cambridge Nat. Hist., Vol. 4, 1920, Chapter VIII, pp. 221-252, fig. in text 136, 151.

Classification of Trilobites into sixteen families

Fam. 1. Agnostidae; Genera *Agnostus, Microdiscus.*

Fam. 2. Shumardiidae; Genus *Shumardia.*

Fam. 3. Trinucleidae; Genera *Orometopus,* p. 230, fig. 140a, *Ampyx,* p. 230, fig. 140c, *Trinucleus,* p. 230, fig. 140b, *Dionide.*

Fam. 4. Harpedidae; Genus *Harpes,* p. 248, fig. 150a.

Fam. 5. Paradoxidae; Genera *Olenellus, Holmia,* p. 246, fig. 148, *Mesonacis, Olenelloides,* p. 247, fig. 149, *Paradoxides,* p. 246, fig. 147, *Zacanthoides, Centropleura, (Anopolenus),—Remopleurides,* p. 248, fig. 150d. This genus probably belongs to a separate family. (Miller, 1889, placed it under *Remopleuridae.*)

Fam. 6. Conocephalidae (Conocoryphidae) ; Genera *Conocoryphe,* p. 248, fig. 150e, *Atops, Ctenotephalus, Bathynotus.*

Fam. 7. Olenidae; Genera *Ptychoparia, Angelina,* p. 248, fig. 150h, *Solenopleura,* Sao, p. 239, fig. 143, *Agraulos (Arionellus), Ellipsocephalus,* p. 248, fig. 150b, *Protolenus, Olenus,* p. 248, fig. 150c, *Peltura, Acerocare, Eurycare, Ctenopyge, Leptoplastus, Triarthrus,* p. 237, fig. 142a, b, *Parabolina, Sphaerophthalmus, Parabolinella, Ceratopyge* (position doubtful),—*Dikelocephalus,* perhaps belongs to a distinct family. (Miller, 1889, placed it under Dicellocephalidae.)

Fam. 8. *Calymenidae;* Genera *Calymene,* p. 244, fig. 137, *Synhomalonotus, Homalonotus,* p. 228, fig. 136.

Fam. 9. Asaphidae; Genera *Asaphus,* (Subgen. *Megalaspis*), *Adaphellus, Symphysurus,* &c., *Ogygia ,Barrandia, Niobe, Nileus, Illaenus,* p. 248, fig. 150f,

WOODS, HENRY.—Continued.

Bumastus, Stygina.—Aeglina is usually placed in this family, but its systematic position is doubtful.

Fam. 10. Bronteidae; Genus *Bronteus.*

Fam. 11. Phacopidae; Genera *Phacops,* p. 227, fig. 138, and p. 248, fig. 150i, *Trimerocephalus, Acaste, Pterygometopus, Chasmops, Dalmanites, Cryphaeus.*

Fam. 12. Cheiruridae; Genera *Cheirurus, Deiphon,* p. 250, fig. 151c, *Placoparia, Sphaerexochus, Amphion, Staurocephalus.*

Fam. 13. Proetidae; Genera *Proetus,* p. 248, fig. 150g, *Arethusina,* p. 250, fig. 151b, *Cyphaspis, Phillipsia,* p. 250, fig. 151a, *Griffithides, Brachymetopus, Dechenella.*

Fam. 14. Encrinuridae; Genera *Encrinurus, Cybele, Dindymene.*

Fam. 15. Acidaspidae; Genus *Acidaspis,* p. 250, fig. 151f.

Fam. 16. Lichidae; Genera *Lichas* (subgen. *Arges*), *Dicranogmus, Conolichas, Ceratolichas.*

The author remarks that many genera are not included in this classification and a few are preoccupied for other genera in Natural History.

————Eurypterida.—The Cambridge Nat. Hist., Vol. IV, 1920, pp. 283-294, figs. in text.

The genera and species included in this paper are *Eurypterus fischeri* fig. 161, 162, *Pterygotus osiliensis,* fig. 164, *Slimonia acuminata,* fig. 165, *S. laconus,* fig. 166.

The genera *Hughmilleria, Dolichopterus, Eusarcus* and *Strabops* are noted but not described.

The author remarks, p. 294, "The Eurypterids are distinguished from the Scorpions by the much greater development of the last pair of legs. The large metastomia of the former is homologous with the sternum of the Scorpion. The genital operculum is much smaller in Scorpions than in Eurypterids, and in this respect the latter agree with *Thelyphemus* (one of the Pedipalpi), more than the Scorpions."

WOODWARD, HENRY. On a Carboniferous Trilobite from Angran in Niderale, York.—Trans. Leeds Geol. Assoc., Part XIV, 1909, pp. 10-12.

ZITTEL, A. VON. Grundzüge der Palaeontologie (Palaeozoologie).—Reworked by F. Broili, Part Invertebrata, 5th Edition.

Order 4. Phyllopoda:

Palaeozoic; *Protocaris* Walc., *Ribeiria* Sharp, *Ribeirella* Schub., *Notostraca* Walc., *Naraoia* Walc., fig. 1308, *Burgessia* Walc., *Waptia* Walc., fig. 1309.

Branchipodidae; *Anostraca* Calman, *Opabinia* Walc., *Leanchoilia* Walc., *Yohoia* Walc., *Bidentia* Walc., *Rochdalia* Woodw., *Branchiopodites vectenis* Woodw.

Estheriidae; *Estheria* Rüpp, fig. 1310, *Leaia* Jones, *Estheriella* Weiss, *Schizodiscus* Clarke, *Beyrichona, Hipponicharion, Bradoria, Aluta* Matthew, *Polyphyma* Greem.

Order 5. Trilobita:

Fam. 1. Mesonacidae Walcott, (Olenellidae Moberg); *Mesonacis* Walc., *Elliptocephala* Emmons, *Olenellus* Hall, *Olenelloides* Peach & Horne, *Holmia* Matthew, fig. 1324, *Callavia* Matt., *Peachella* Walc., *Paedeumias* Walc., *Kjerulfia* Kiaer, *Paradoxides* Brong., *Metadoxides* Bornem., *Hydrocephalus* Barr., *Oryctocephalus* Walc., *Acanthoides* Walc., *Olenoides* Meek, *Dorypyge* Dames, *Damesella* Walc., *Neolenus* Matth., *Redlichia* Cossman, *Olenopsis* Bornem., *Vanuxemella* Walc., *Hanburia, Tsinania* Walc.? *Remopleurides* Portlock.

Fam. 2. Olenidae Burmeister; *Olenus* Dalm., *Acerocare* Ang., *Eurycare* Ang., *Ctenopyge* Linrs., *Leptoplastus* Ang., *Teinistion* Monke, *Blackwelderia* Walc., *Marjumia* Walc., *Lisania* Walc., *Ptychoparia* Corda, *Liostracus* Ang., *Solenopleura* Ang., *Hicksia* Delg., *Hystricurus* Raym., *Sao* Barr., *Euloma* Ang.,

Bavarilla Barr., *Protolenus* Matth., *Palaeolenus* Mansuy, *Agraulos* Corda, *Plethopeltis* Raym., *Inouyia* Walc., *Shantungia* Walc., *Triarthrus* Green, *Peltura* Milne Edw., *Drepanura* Berg., *Stephanocare* Monke, *Ellipsocephalus* Zenker, *Parabolina* Salter, *Parabolinella* Brög., *Parabolinopsis* Hock.,? *Micmacca Matth.*, Norwoodidae, *Norwoodia* Walcott.

Fam. 3. Conocoryphidae Angelin; *Conocoryphe* Corda, (*Conocephalites* Barr., *Atops* Emm., *Bailiella* Matth.), *Ctenocephalus* Corda, *Alocistocare* Lorenz, *Acrocephalites* Wallerius, *Eryx* Ang., *Carausia* Hicks, *Bathynotus* Hall,? *Carmon* Barr., *Shumardia* Bill., *Menomonidae,—Menomonia,* Millardia, *Dresbachia* Walc.

Fam. 4. Ceratopygidae Raymond: *Albertella* Walc., *Ceratopyge* Corda., *Crepicephalus* Owen.? *Lonchocephalus* Owen, *Saratogia* Walcott, *Wanneria* Walcott.

Fam. 5. Corynexochidae Angelin-Walcott: *Corynexochus* Ang., (*Karlia* Walcott), *Bathyuriscus* Meek, *Dolichometopus* Ang.

Fam. 6. Dicellocephalidae Miller; *Dikelocephalus* Owen, *Dikelokephalina* Brögger, *Bathyurus* Bill., *Petigurus* Raym., *Platycolpus* Raymond; *Proampyx* Frech,? *Pagodia, Lisania, Chuangia* Walc.? *Solenopleura* Ang., *Menocephalus* Owen, *Levisia, Anomocarella* Walc.,? *Coosia, Saukia,* Walc., *Calvinella, Osceola* Walc., *Ptychaspis* Hall., *Holocephalina* Salter,? *Anomocare* Ang.,

Fam. 7. Agnostidae Dalman: *Agnostus* Brong., *Goniodiscus* Raym.,? *Mollisonia* Walc., *Eodiscus* Matth., *Pagetia* Walc.

Fam. 8. Trinucleidae Salter:? *Orometopus* Ang., *Trinucleus* Llwyd, (*Cryptolithus* Green), *Ampyx* Dalm., (*Lonchodonus Raphiophorus* Ang.), *Dionide* Barr., *Endymionia* Bill.

Fam. 9. Harpedidae Barrande: *Harpes* Goldf., (*Eoharpes* Raym.,) *?Harpides* Beyr.

Fam. 10. Asaphidae Emmrich: *Ogygopsis* Walc., *Orria* Walc., *Asaphiscus* Meek, *Blountia, Maryvillia* Walc., *Niobe* Ang., *Barrandia* McCoy, *Megalaspis* Ang., *Ogygia* Brong., (*Ogygites* T. & Lebec), *Asaphus* Brong., *Ptychopyge* Ang., *Pseudasaphus* Schm., *Megalaspides* Brög., *Basilicus* Salter, *Brachyaspis* Salter, *Isotelus* DeKay, *Holasaphus* Matth., *Onchometopus* Schm., *Asaphellus* Callw., *Hemigyraspis* Raym., *Cryptonymus* Eich., *Symphysurus* Goldf., *Nileus* Dalm., *Aeglina* Barr., *Telephus* Barr.

Fam. 11. Illaenidae Corda: *Illaenurus* Hall, *Illaenus* Dalm., (Subgenera: *Octillaenus, Panderia* Salter, *Dysplanus* Burm., *Ectillaenus* Salt., *Illaenopsis* Salt.), *Bumastus* Murch., *Stygina, Psilocephalus* Salt., *Thaleops* Conrad,? *Giordanella* Bornem.

Fam. 12. Calymenidae Brongniart; *Calymene* Brong., *Pharostoma* Corda, *Synhomalonotus* Pomj., *Homalonotus,* (Subgenera *Brongniartia, Koenigia, Burmeisteria* Salter, *Trimerus, Dipleura* Green, *Calymenella* Bergeron).

Fam., 13. Proetidae Barrande: *Arethusina* Barr., *Phillipsinella* Novák, *Cyphaspis* Burm., *Haploconus* Raymond, *Proetus* Steininger, (*Drevermannia*), *Cyrtocymbole,* Richter, *Typhloproetus* Frech-Richter, *Euproetus* Richter, *Tropidocoryphe* Novák. *Astycoryphe* Richter, *Pteroparia, Skemmatopyge* Richter, *Dechenella* Kayser, (Subgen. *Eudechenella, Basidechenella, Paradechenella* Richter), *Schizoproetus* Richter, *Phillipsia* Portlock, *Griffithides* Portl., *Pseudophillipsia* Gemm., *Brachymetopus* McCoy.

Fam. 14. Bronteidae Barrande: *Bronteus* Goldfuss, (*Goldius* DeKoninck), *Thysanopeltis* Corda, *Bronetopsis* N. & Eth.

Fam. 15. Cheiruridae Salter: *Cheirurus* Beyr., *Ceraurus* Green, *Cyrtometopus, Sphaerocoryphe* Ang., *Crotalacephalus* Salter, *Pseudosphaerexochus, Nieszkowskia* Schm., *Deiphon* Barr., *Placoparia* Corda, *Areia* Barr., *Sphaerexochus* Beyr., *Amphion* Pander, *Staurocephalus* Barr., *Pliomera* Ang., *Diaphanometopus* Schm., *Youngia* Lindstr. Burlingidae—*Burlingia* Walc., *Schmalenseeia* Moberg.

Fam. 16. Encrinuridae Linnarsson: *Cybele* Lovén, *Cybeloides* Slocum, *Dindymene* Corda, *Encrinurus* Emm., *Cromus* Barr.

Fam. 17. Acidaspidae Barrande: *Acidaspis* Murchison, (*Odontopleura* Emm.) (Subgen. *Selenopeltis* Corda, *Leonaspis, Primaspis, Miraspis, Radiaspis*

Zittel, A. von.—Continued.

Pseudomonaspis Richter, *Ceratocephala* Warder, *Dicranurus* Conrad, *Ancyropyge* Clarke), *Glaphurus* Raym.

Fam. 18. Lichadidae Corda: *Lichus* Dalman. (Subgen. *Protolichas, Deuterolichas* Reed, *Arges* Goldf., *Corydocephalus* Corda, *Amphilichas* Raym., *Conolichas* Dames, *Acanthopyge, Dicranopeltis* Corda, *Homolichas* Schmidt, *Eiflarges* Richter, *Arctinurus* Castelnau, &c.) (*Uralichas*) *ribeiroi* Delg.

Fam. 19. Phacopidae Salter: *Phacops* Emm., *Trimerocephalus* McCoy, *Reedia* Wedekind, *Acaste* Goldf., (*Phacopidella* Reed), *Pterygometopus* Schm., *Dalmania* Emm., (Subgen. *Dalmanitina* Reed, *Hausmannia* Hall & Clarke) *Dalmanites* Barr., *Glockeria, Denkmannites* Wedekind, *Odontocephalus* Conrad, *Cryphaeus* Green, *Calmonia, Pennaia, Proboloides* Clarke.

Malacostraca:

Archaeostoma Stromer.

Hymenocaridae: *Hymenocaris* Salter, *Hurdia, Tuzoia, Odaria, Fieldia, Carnarvonia* Walc.

Ceratiocaridae: *Ceratiocaris* McCoy, *Caryocaris* Salter, *Sinocaris* Mansuy, *Phasganocaris* Novák, *Acanthocaris* Peach, *Macrocaris* Miller.

Echinocaridae; *Echinocaris* Whitfield, *Pephricaris* Clarke, *Aristozoe* Barr., (*Bactropus* Barr.), *Ptychocaris* Novák, *Tropidocaris* Beecher, *Emmelezoe* J. & W.

Rhinocaridae: *Rhinocaris* Clarke, *Mesothyra* Hall & Clarke,? *Dithyrocaris* Scouler.

Discinocaridae: *Discinocaris* Woodw., *Dipterocaris* Clarke, *Aspidocaris* Reuss, *Aptychopsis* Barr., *Peltocaris* Salter.

Order 2. Syncarida Packard & Calman.

Palaeocaris M. & W., *Gampsonyx* Jordan, (*Uronectes* Bronn).

Order 3. Schizopoda, Spaltfüsser: *Anthrapalaemon* M. & W., *Pseudogalathea, Tealliocaris, Palaemysis,* Peach, *Anthrapalaemon* Salt., *Palaeopalaemon* Whitfield.

Brachyura: *Gitocrangon* Ritcher, *Brachyopyge* Woodward.

Class 2. Merostomata Woodward.

Order 1. Limulava Walcott.

Sidneyidae: *Sidneyia* Walc., *Amiella* Walc.

Order 2. Gigantostraca Haekel.

Eurypteridae: *Strabops* Beecher, *Eurypterus* DeKay, *Onchopterus* C. & R., *Tylopterus* C. & R., *Megalograptus* Miller, *Stylonurus* Page, *Dolichopterus* Hall, *Eusarcus* Grote & Pitt, (*Drepanopterus* Laurie, *Eurysoma* Claypole), *Echinognathus* Walc., *Anthraconectes* M. & W., *?Adelophthalmus* Jordan & H. von Meyer, *?Eurypterella* Matth., *?Beltina* Walc., *Slimonia* Page, (*Himantopterus* Salter).

Pterygotidae: *Pterygotus* Ag., *Erettopterus* H. & S., *Hughmilleria* Sarle, *Glyptoscorpius* Peach, *Hastimima* White.

Order 3. Xiphosura.

Fam. 1. Bellinuridae Packard: *Belinurus* Koenig, *Prestwichia* Woodward, (*Euproops* M. & W.), *Protolimulus* Pack., *Prolimulus* Fritsch, *Halicyne* von Mayer.

Fam. 2. Aglapsidae Clarke: *Aglapsis* Hall.

Fam. 3. Hemiaspidae Zittel: *Bunodes* Eichw., (*Exapinurus* Nieszk.) *Hemiaspis* Woodw., *Neolimulus* Woodw., *Pseudoniscus* Niezk., *Bunodella* Matth.

Entomostraca:

Order 2. Cirripedia.

Fam. 1. Lepidocoleidae Clarke: *Lepidocoleus* Faber, *Anatifopsis* Barr.

Fam. 2. Turrilepadidae Clarke: *Turrilepas* Woodward, *Strobilepis* Clarke.

Order 3. Ostracoda.

Leperdita Rouault, *Isochilina* Jones, *Leperditella* Ulr., *Schmidtella* Ulrich, *Paraparchites* Ulr. & Bassl., *Beyrichia* McCoy, *Primitia* Jones, *Dicrancila* Ulrich, *Primitiella* Ulr., *Ulrichia* Jones., *Eurichilina* Ulr., *Jonesella* Ulr., *Bollia* Jones & Holl., *Tetradella* Ulr., *Ceratopsis* Ulr., *Kloedenia* J. & H., *Kirkbya* Jones, *Aeschmina* J. & H.

Cytheridae: *Cythere* Müller, *Cythereis* Jones, *Cytheridea* Bosq., *Carbonaria* Jones, *Thlipsura* J. & H., *Octonaria* Jones.

PART II.

AN ALPHABETICAL LIST OF THE GENERA AND SUB-GENERA OF THE TRILOBITA.

Acanthaloma Conrad, 1840. See *Ceratocephala* Warder.

Acantheus Angelin, 1854. (Corrected to *Aneucanthus,* q. v.)

Acanthocnemis Corda, 1847. See *Sao.*

Acanthogramma Corda, 1847. See *Sao.*

Acantholenus Matthew, 1898. 1 sp. Upper Cambrian.
Genotype *Leptoplastus spriniger* Matthew.

Acanthopleurella Groom, 1902. 1 sp.
Genotype *A. grindrodi.*

Acaste Goldfuss, 1843. 29 sp.
Genotype *Phacops downingiae* Murchison.

Acerocare Angelin, 1878. 8 sp., 1 var. Fam. Olenidae. Cambrian.
Genotype *A. ecorne* Angelin.

Acidaspis Murchison, 1839. 118 sp. Fam. Acidaspidae. Ordovician, (Silurian, Devonian.)
Genotype *A. brightii* Murchison.

Acrectopyge Corda, 1847. See *Cybele.*

Acrocephalites Wallerius, 1895. 11 sp. Cambrian.
Genotype *A. stenometopa* Angelin.

Acrolichas Foerste, 1920. 12 sp. Ordovician.
Genotype *Lichas cucullus* Meek and Worthen.

Actinopeltis Corda, 1847. 5 sp. Ordovician.
Genotype *A. corali-alexandri* Corda.

Aeglina Barrande, 1852. 25 sp. 1 var. Fam. Aeglinidae Gürich. Ordovician.
Genotype *Egle rediviva* Barrande.
Cyclopyge has priority over Aeglina.

Agnostus Brongniart, 1822. 107 sp., 9 var. Fam. Agnostidae. Cambrian, Ordovician.
Genotype *Entomolithus paradoxus pisiformis* Linnè.

Agraulos Corda, 1847. 49 sp. credited; probably too many. Cambrian.
Genotype *Arion ceticephalus* Barrande.

Albertella Walcott, 1908. 5 sp. Cambrian.
Genotype *A. helena* Walcott.

Alceste Corda 1847. See *Illaenus.*

Alokistocare Lorenz, 1906. 7 sp. Cambrian.
Genotype *Ptychoparia subcoronata* Hall & Whitfield.

Amphilichas Raymond, 1905. 12 sp. Ordovician.
Genotype *Platymetopus lineatus* Angelin.

Amphion Pander, 1830. See *Pliomera.*

Amphitryon Corda, 1847. See *Remopleurides.*

Amphoton Lorenz, 1906. See *Dolichometopus.*

Ampyx Dalman, 1826. 61 sp., 2 var. Fam. Trinucleidae. Ordovician, Silurian.
Genotype *A. nasutus.*

Ampyxina Ulrich. Ordovician.
Genotype *A. bassleri.*

Anacheirurus Reed, 1896. 1 sp. Fam. Cheiruridae. Upper Tremadoc.
Genotype *Cheirurus (Eccoptochile) frederici* Salter.

Ancyropyge Clarke, 1892. Fam. Enrinuridae. Devonican.
Genotype *Acidaspis (Ancyropyge) romingeri.*

Aneucanthus Angelin, 1852. Cambrian.
Genotype *Acantheus acutangulus* Angelin.

Angelina Salter, 1859. 5 sp. Cambrian.
Genotype *A. sedgwicki* Salter.

Anisonotus Raymond, 1920. 1 sp. Ordovician.
Genotype *Shumardia glacialis* Billings.

Anitopyge Girty, 1908. 2 sp. Permian.
Genotype *Phillipsia perannulata* Shumard.

Anomocare Angelin, 1854. 30 sp. Fam. Olenidae. Cambrian.
Genotype *A. laeve* Angelin.

Anomocarella Walcott,1905. 23 sp. Middle Cambrian.
Genotype *A. chinesis* Walcott.

Anopocare Angelin, 1854.=*Peltura.*

Anopolenus Salter, 1864. = *Centropleura.*

Anthes Goldfuss, 1843. = *Peltura.*

Anthracopeltis Boulay, 1880. 1 sp. Devonian?
Genotype *A. crepini* Boulay.

Apatokephalus Brögger, 1896. 9 sp., 1 var. Cambrian.
Genotype *Trilobites serratus* Boeck.

Archegonus Burmeister, 1843. Carboniferous.
Genotype *Calymene aequalis* von Meyer.
Burmeister used this genus for *Phillipsia* and *Griffithides.*

Arctinurus Castelnau, 1843. 5 sp. Ordovician.
Genotype *Paradoxides boltoni.*

Areia Barrande, 1852. 3 sp. Fam. Encrinuridae. Ordovician.
Genotype *A. bohemica* Barrande.

Arethusa Barrande, 1846. See *Aulacopleura* Corda, 1847.

Arethusina Barrande, 1858.=*Aulacopleura*.

Arges Goldfuss, 1839, preoccupied. See *Ceratarges*.

Arion Barrande. See *Agraulos* Corda.

Arionellus Barrande, 1850. See *Agraulos* Corda.

Arraphus Angelin. = *Harpes*.

Arthricocephalus Bergeron, 1899. Cambrian.
Genotype *A. chauveaui* Bergeron.

Arthrorhachis Corda, 1847.
Genotype *Agnostus tardus* Barrande.

Asaphelina Munier, Chalmas and Bergeron, 1889. 2 sp. Ordovician.
Genotype *A. miqueli B...* (Selected by Brögger.)

Asaphellus Callaway, 1877. 7 sp., 1 var. Upper Tremadoc.
Genotype *A. homfrayi*.

Asaphiscus Meek, 1873. 12 sp. Cambrian.
Genotype *A. wheeleri* Meek.

Asaphus Brongniart, 1822. About 86 sp., 8 var. Fam. Asaphidae. Ordovician.
Genotype *Entomolithus paradoxus expansus* Linné.

Aspiodolites Conrad. See *Dalmanites*.

Asteropyge Corda, 1847. = *Dalmanites*.

Astycoryphe Rud. and E. Richter, 1919. 6 sp. Devonian.
Genotype *A. senckenbergiana*.

Atops Emmons, 1844. Cambrian.
Genotype *A. trilineatus* Emmons.

Aulacopleura Corda, 1845. 9 sp. For *Arethusa* Barrande, preoccupied. Ordovician, Devonian.
Genotype *Arethusa koninckı* Barrande.

Avalonia *Walcott*, 1898. 3 sp.
Genotype *A. manuelensis* Walcott.

Bailiella Matthew, 1884. 2 sp. Cambrian.
Genotype *Conocephalites baileyi* Hartt.

Barrandia Hall, = *Mesonacis* and *Olenellus*.

Barrandia McCoy, 1849. 7 sp. Ordovician.
Genotype *Ogygia portlocki* Salter, = *Homalopteon*.

Basidechenella Richter. 3 sp. Devonian.
Genotype *Dechenella* (*Basidechenella*) *kayseri*.

Basilicus Salter, 1849. 14 sp. Ordovician.
Genotype *Asaphus tyrannus* Murchison.

Bathynotus Hall, 1860. 1 sp. Cambrian.
Genotype *Peltura (Olenus) holopyga* Hall, the *Paradoxides quadrispinosus* Emmons, 1860.

Bathyurellus Billings, 1865. 13 sp. Ordovician.
Genotype *B. abruptus* Billings.

Bathyuriscus Meek, 1873. 18 sp. Cambrian.
Genotype *Bathyurus? haydeni* Meek.

Bathyurus Billings, 1859. 24 sp. Ordovician.
Genotype *Asaphus extans* Hall.
About fifty species have been referred to this genus, of which twenty-six are probably erroneous.

Bavarilla Barrande, 1868. 1 sp. Cambrian.
Genotype *B. hofensis* Barrande.

Beltella Lake, 1919. 4 sp. Cambrian.
Ellipsocephalus depressus Salter.

Bergeronia Matthew, 1895. 3 sp. Cambrian.
Genotype *Protolenus elegans* Matthew.

Blackwelderia Walcott, 1906. 3 sp. Cambrian.
Genotype *Calymene? sinensis* Bergeron.

Blainia Walcott, 1916. 4 sp. Cambrian.
Genotype *Asaphiscus (Blainia) gregarius* Walcott.

Blountia Walcott, 1916. 17 sp. Cambrian.
Genotype *B. minula* Walcott.

Boeckia Brögger, 1882. 4 sp. Cambrian.
Genotype *B. hirsuta* Brögger.

Bohemilla Barrande, 1872. 3 sp. 1 mutation. Ordovician.
Genotype *B. stupenda.=Aeglina.*

Bolbocephalus Whitfield, 1890. 2 sp. Ordovician.
Genotype *Bathyurus seelyi* Whitfield.

Bornemannia Walcott, 1908. No description. Cambrian.
Genotype *B. prima* Walcott.

Bounyongia Etheridge & Mitchell, 1917. 1 sp. Silurian.
Genotype *Ceratocephala (Bounyongia) bowningemsis.*

Brachyampyx Forbes, 1849. See *Ampyx nudus.*

Brachyaspis Salter, 1866. 4 sp. Ordovician.
Genotype *Isotelus rectifrons* Portlock.

Brachymetopina Reed, 1893. 8 sp. Carboniferous.
Genotype *B. strzeleckii.*

Brachymetopus McCoy, 1847. 10 sp. Carboniferous.
Genotype *Phillipsia maccoyi.*

Brachypleura Angelin, 1852. 2 sp. Fam. Remopleuridae. Ordovician.
Genotype *B. sexlineata.*

Brongniartella Reed, 1918. 6 sp. Ordovician.
Genotype *Homalonotus (Brongniartella) bisulcatus.*

Brongniartia Eaton, 1832, not of Leach, 1824.=*Homalonotus.*

Bronteopsis Wyville Thompson, 1857. 2 sp. Fam. Asaphidae. Ordovician.
Genotype *B. scotica* Salter.

Bronteus *Goldfuss,* 1839.= *Goldius.*

Bumastus Murchison, 1839. 34 sp. Fam. Bumastidae. Ordovician. Silurian.
Genotype *Bumastus barriensis* Murchison.

Burlingia Walcott, 1908. 1 sp. Cambrian.
Genotype *B. hectori* Walcott.

Burmeisterella Reed, 1918. 5 sp. Lower Devonian.
Genotype *Homalonotus (Burmeisterella) elongatus.*

Burmeisteria Salter, 1865. 9 sp. Fam. Calymenidae. Devonian.
Genotype *Homalonotus herschelii.*

Cainatops Matthew, 1899. 1 sp. Cambrian.
Genotype *Conocoryphe pustulosus* Matthew.

Callavia Matthew, 1897. 9 sp. Cambrian.
Genotype *Olenellus (Holmia) bröggeri* Walcott.

Calmonia Clarke. 5 sp. Devonian.
Genotype *C. signifer.*

Calvinella Walcott, 1914. 4 sp. Upper Cambrian.
Genotype *Dikelocephalus spiniger* Hall.

Calymene *Brongniart,* 1822. 58 sp. Fam. Calymenidae. Silurian, Devonian.
Genotype *Trilobus tuberculatus* Bronn.

Calymenella Bergeron, 1890. 2 sp. Ordovician.
Genotype *C. boselli* Bergeron.

Calymenopsis Munier, Chalmers & Bergeron. 1 sp. Cambrian.
Genotype *C. filacovi.*

Caphyra Barrande, 1846. 3 sp. Ordovician.
Genotype *C. radians* Barrande.

Carausia Hicks, 1872. 1 sp. Cambrian.
Genotype *C. menevensis* Hicks.

Carmon, Barrande, 1872. 1 sp. Cambrian.
Genotype *Trilobites mutilus* Barrande.

Catadoxides Matthew, 1899. Subg. of *Metadoxides,* Cambrian.
Genotype *M. magnificus* Matthew.

Celmus Angelin, 1854. 1 sp. Ordovician.
Genotype *C. granulatus* Angelin.

Centropleura Angelin, 1854. 13 sp. 11 species of *Anopolenus* are included. Cambrian.
Genotype *paradoxides lovéni.*

Cephalocanthus Lapworth, 1888, not of Lacepede, 1802.=*Callavia* and *Holmia.*

Ceratarges Gürich, 1901.
Genotype *Arges armatus* Goldfuss.

Ceratocephala Warder, 1838. 37 sp. Fam. Acidaspidae. Silurian.
Genotype *C. goniata* Warder.

Ceratolichas Hall & Clarke, 1888. 3 sp. Fam. Lichadidae. Lower Devonian.
Genotype *C. gryps.*

Ceratopyge Corda, 1847. 4 sp. and vars. Fam. Ceratopygidae Raymond. Cambrian.
Genotype *C. forficula* Sars.

Ceraurinus Barton, 1913. 11 sp. Upper Ordovician.
Genotype *C. marginatus* Barton.

Ceraurus Green, 1832. 24 sp. Fam. Cheiruridae. Ordovician.
Genotype *C. pleuraxanthemus.*

Chariocephalus Hall., 1863. 1 sp. Cambrian.
Genotype *C. whitfieldi* Hall.

Chasmops McCoy, 1849. 32 sp. 2 var. Ordovician.
Genotype *Calymene odini* Eichwald.

Chaunoproetus Rud. & E. Richter. Devonian.
Genotype *Proetus (Chaunoproetus) palensis.*

Cheilocephalus Berkey, 1898. 1 sp. Cambrian.
Genotype *C. st. croixensis* Berkey.

Cheiropyge Diemer, 1897. 1 sp. Carboniferous.
Genotype *C. himalayensis.*

Cheirurus Beyrich, 1845. 22 sp. Ordovician, Silurian
Genotype *C. exsul* Beyrich.

Chondroparia Lorenz, 1906. 1 sp. Cambrian.
Genotype *Agraulos pusillus* Matthew.

Chuangia Walcott, 1911. 4 sp. Cambrian.
Genotype *Ptychoparia? batia* Walcott.

Clelandia Crossman, 1902. 1 sp. Replaces *Harrisia* Cleland, 1903, preoccupied. Ordovician.
Genotype *Harrisia parabola* Cleland.

Colymbus Hadding, 1913. 1 sp. Ordovician.
Genotype *C. lovisae.*

Conaspis Hall, 1863. 15 sp. Cambrian.
Genotype *Conocephalites perseus* Hall.

Condylopyge Corda, 1847.
Genotype *Battus rex* Barrande.

Coniopleura Corda, 1847. See *Cyphaspis.*

Conocephalites Barrande, 1852. For Preoccupied *Conocephalus* and *Trigonocephalus* Zenker, 1833. = Various forms in many genera.

Conocephalus Zenker, 1833. See *Conocephalites.*

Conocoryphe Corda, 1847, 34 sp. Fam. Conocoryphidae. Cambrian.
Genotype *Trilobites sulzeri* Schlotheim.

Conokephalina Brögger, 1886. 8 sp. Cambrian.
Genotype *Conocephalites ornatus* Brögger.

Conolichas Dames, 1888. 7 sp. Devonian.
Genotype *Lichas acquilobus* Steinhardt.

Conoparia Corda, 1847. 2 sp. Barrande referred this to *Cyphaspis.* It contains species with twelve thoracic segments. Devonian.
Genotype *Cyphaspis barrandei.*

Conophrys Callaway, 1874. See *Shumardia.*

Coosia Walcott, 1911. 6 sp. Cambrian.
Genotype *C. superba* Walcott.

Cordania Clarke, 8 sp. Devonian.
Genotype *Phaethonides cyclurus.*

Cornuproetus Rud. & E. Richter, 1919. Devonian.
Genotype *Proetus (Cornuproetus) senckenbergianus.*

Coronura Hall & Clarke, 1888. 3 sp. Devonian.
Genotype *C. aspectans* (Conrad).

Corycephalus Hall & Clarke. 3 sp. Devonian.
Genotype *C. regalis.*

Corydocephalus Corda, 1847. 17 sp. Silurian.
Genotype *C. flabellatus* Corda = *C. palmatus* Barrande.

Corynexochus Angelin, 1854. 10 sp. Fam. Corynexochidae. Cambrian.
Genotype *C. spinulosus* Angelin.

Subgenus: *Bonnia* Walcott. 3 sp. Cambrian.
Genotype *Corynexochus parvulus* Billings.

Craspedarges Gürich, 1901.
Genotype *C. wilcanniae.*

Crepicephalus Owen, 1852. 33 sp. Cambrian.
Genotype *Dicellocephalus iowensis* Owen.

Crithias Corda, 1847. See Sao.

Cromus Barrande, 1852. 6 sp. Referred to Encrinurus.

Crossoura Moberg & Segerberg, 1906. 2 sp. Ordovician.
Genotype *C. parvula* Mauds.

Crotalocephalus Salter, 1853. 10 sp. Silurian, Devonian.
Genotype *Calymene articulata* Münster.

Crotalurus Volborth. 1 sp. Ordovician.
Genotype *C. barrandei.*

Cryphaeus Green, 1837, preoccupied in Coleoptera. See *Asteropyge* Corda.

Cryphina Oehlert, 1889. 1 sp. Devonian.
Genotype *C. andegavensis.*

Cryptolithus Green, 1832, (for *Trinucleus*). 61 sp. Ordovician.
Genotype *C. tesselatus* Green.

Cryptonymus Eichwald, 1825, see *Asaphus* (4 sp.) and *Illaenus* (4 sp.)

Cryptonymus Eichwald, 1840, see *Encrinurus* (6 sp.).

Ctenocephalus Corda, 1847, 7 sp., 3 var. Cambrian.
Genotype *C. barrandei* Corda.

Ctenopyge Linnarsson, 1880, 17 sp. Cambrian.
Genotype *Olenus* (*Sphaerophthalmus*) *pecten* Salter.

Cybele Lovén, 1845. 28 sp. Ordovician.
Genotype *Calymene bellatula* Dalman.

Cyreloides Slocum, 1913. 6 sp. Ordovician.
Genotype *C. iowensis* Slocum.

Cyclognathus Linnarsson, 1875. 5 sp. 1 var. Cambrian.
Genotype *C. micropygus* Linnarsson.
Moberg and Möller hold this genus to be a synonym of *Acerocare.*

Cyclopyge Corda, 1847. 25 sp., 1 var. See *Aeglina.*

Cylindraspis Sandberger, 1856. 2 sp. Devonian.
Genotype *C. latispinosa.*
Kayser referred *Phillipsia aequalis* to it; Richter referred *Cylindraspis macrophthalma* to *Euproetus.*

Cylindrocephalus Trinker, preoccupied.

Cyphaspides Novak, 1890. 5 sp. Devonian.
Genotype *C. Scuticauda.*

Cyphaspis Burmeister, 1843. 77 sp. Ordovician, Silurian, Devonian.
Genotype *Phacops ceratophthalmus* Goldfuss.

Cyphoniscus Salter, 1852. Cambrian.
Genotype *C. socialis* Salter.

Cyrtometopus Angelin, 1852, 12 sp., 1 var. Fam. Cheiruridae. Ordovician.
Genotype *Calymene clavifrons* Dalman.

Cyrtosymbole Richter, 1913, 11 sp. Devonian.

Dalmania Emmrich, 1844. Preoccupied. Ordovician, Silurian, Devonian.

Dalmanites Barrande, 1852. 10 sp., 10 var. For *Dalmania* preoccupied.
Genotype *Trilobus caudatus* Bronn.

Dalmanitina Reed, 1908. 11 sp., 1 var. Ordovician, Silurian.
Genotype *Dalmanites socialis* Barrande.

Damesella Walcott, 1905. 3 sp. Cambrian.
Genotype *D. blackwelderi* Walcott.

Dawsonia Matthew = *Goniodiscus*.

Dechenella Kayser, 1880. 29 sp. Devonian.
Genotype *Trilobites verticalis* Burmeister, 1843.
Subgenera:
Basidechenella Richter, 1912. 4 sp.
Eudechenella Richter, 1912. 19 sp.
Eudechenella Richter, 1912. 19 sp.
Paradechenella Richter, 1912. 1 sp.

Deiphon Barrande, 1850. 4 sp. Silurian.
Genotype *D. forbesi* Barrande.

Denckmannia Wedekind, 1914. 2 sp. Devonian.
Genotype *Phacops volborthi* Barrande.

Deucalion Stschegloff, 1827.
The author proposed *Deucalion* for two species now known as *Nileus armadillo* and *Illaenus crassicauda*.

Diaphanometopus Schmidt, 181. 1 sp. Fam. Cheiruridae. Ordovician.
Genotype *D. volborthi* Schmidt.

Dichagnostus Jaekel, 1891. See *Pleuroctenium*.

Dicranactis Corda, 1847. See *Bronteus*.

Dicranogmus Corda, 1847. 3 sp. Silurian.
Genotype *Lichas simplex* Barrande.
Gürich, 1901, proposed *Liparges* for Corda's genus. Reed placed it under *Corydocephalus*.

Dicranopeltis Corda, 1847. 9 sp. Ordovician, Silurian.
Genotype *Lichas scaber* Beyrich.
Dr. Gürich proposed *Trachylichas* for Corda's genus, which Reed placed under *Dicranopeltis* with 5 species.

Dicranurus Conrad, 1841. 4 sp. Devonian.
Genotype *D. hamatus*.

Dictyocephalites Bergeron, 1895. Cambrian.
Genotype *D. villerbruni*, referred to *Dikelokephalina* by Brögger.

Digomus Gürch. 7 sp. Devonian.
Genotype *Homalonotus gigas* Roemer.

Dikelokephalina Brögger. 6 sp. Cambrian.
Genotype *D. dicraeura* Angelin.

Dikelocephalus Owen, 1852. Fam. Dicellocephalidae Miller. 21 sp. Ordovician.
Genotype *D. minnesotensis* Owen.

Dindymene Corda. 1847. 11 sp. Ordovican.
Genotype *D. frederici-augusti* Corda.

Dinesus Etheridge, 1896. 1 sp. Cambrian.
Genotype *D. ida* Etheridge.

Dione Barrande, 1847. See *Dionide* Barrande, 1847, and *Polytomurus* Corda, 1847.

Dionide Barrande, 1847. 10 sp. Ordovician.
Genotype *D. formosa.*

Diplagnostus Jaekel, 1901.
Genotype *Agnostus planicauda* Angelin.

Dipleura Green, 1832. 6 sp. Devonian.
Genotype *D. dekayi* Green.

Diplorrhina Corda, 1847. See *Peronopsis.*

Dolichometopus Angelin, 1854. 16 sp. Cambrian.
Genotype *D. svecicus* Angelin.

Dorypyge Dames, 1883, 22 sp. 4 var. Cambrian.
Genotype *D. richthofeni* Dames.

Dorypygella Walcott, 1905. 2 sp. = *Teinistion* Monke.

Drepanura Bergeron, 1899. 2 sp. Cambrian.
Genotype *D. premesnili* Bergeron.
Woodward compares the pygidium with *Bathynotus.*

Dresbachia Walcott, 1916. 1 sp. Cambrian.
Genotype *D. amata* Walcott.

Drevermannia Richter, 1913. 7 sp. Devonian.
Genotype *D. schmidti.*

Dysplanus Burmeister, 1843. 17 sp. Silurian.
Genotype *Asaphus centrotus* Dalman.

Ebenezeria Marcou, 1888. = *Elliptocephala.*

Ecconchoecia Moberg, 1895. 1 sp. Cambrian.
Genotype *E. mucronata.*

Eccoptochile Corda, 1847. 12 sp. Ordovician.
Genotype *Cheirurus claviger* Beyrich.

Echinolichas Gürich, 1901. 1 sp. Devonian.
Genotype *Lichas eriopsis* Hall.

Ectenaspis Raymond, 1920. 2 sp. Ordovician.
Genotype *Megalaspis beckeri* Slocum.

Ectenotus Raymond, 1920. 2 sp. Ordovician.
Genotype *Amphion westoni* Billings.

Ectillaenus Salter, 1867. 2 sp. Ordovician.
Genotype *Illaenus* (*Ectillaenus*) *perovalis* (Murchison.)
Raymond, 1916, remarks, "The genus should be dropped."

Egle Barrande, 1846. See *Aeglina* and *Cyclopyge*.

Eifliarges Richter, 1917. Devonian.
Genotype *Lichas* (*Eifliarges*) *caudimirus*.

Ellipsocephalus Zenker, 1833. 1 sp. Cambrian.
Genotype *Trilobites hoffi* Schlotheim.

Elliptocephala Emmons, 1844. 1 sp. Cambrian.
Genotype *E. asaphoides* Emmons.

Elyx Angelin, 1852. 2 sp. = *Ctenocephalus*.

Embolinus Roeminger, 1887. = *Zacanthoides*.

Emmrichella Walcott, 1911. 5 sp. Cambrian.
Genotype *Ptychoparia theana* Walcott.

Encrinurus Emmrich, 1844. 51 sp. Ordovician, Silurian.
Genotype *Trilobus punctatus* Brunn.

Endogramma Corda, 1847. See Sao.

Endymion Billings, changed to *Endymionia*.

Endymionia Billings, 1862. 2 sp. Fam. Edymionidae Raymond. Ordovician.
Genotype *E. meeki* Billings.

Enneacnemis Corda, 1847. See *Sao*.

Eocoryne *Matthew*, 1886.
Genotype *E. gonium* Matthew.

Eodiscus Matthew, 1896. Cambrian.
Genotype *Microdiscus schucherti* Matthew.

Eoharpes Raymond, 1903. To replace *Harpina*, preoccupied. 10 sp. Ordovician.
Genotype *Harpina prima* Barrande.

Eohomalonotus Reed, 1918. To replace *Brogniartia*, preoccupied. 14 sp. Ordovician.
Genotype *Homalonotus* (*Echomalonotus*) *brongniarti* Desl.

Erinnys Salter, 1856. 4 sp. Not of Schranck 1801. = *Bailiella*.

Euarges Gürich, 1901. 2 sp. = *Corydocephalus*.

Eudechanella Richter, 1912. 10 sp. Subgenus of *Dechenella*. Devonian.
Genotype *Phillipsia verneuili* Barrande.

Euloma Angelin, 1854. 9 sp. Cambrian.
Genotype *E. laeve* Angelin.

Euproetus Richter, 1913. 5 sp. Devonian.
Genotype *Proetus* (*Euproctus*) *bivalletus*.

Eurycare Angelin, 1854. 5 sp. Cambrian.
Genotype *E. brevicauda* Angelin.

Eurymetopus Postlethwaite & Goodchild, 1886. 2 sp. Ordovician.
Genotype *E. cumbrianus* P. & G.

Eutrimerocephalus Gortani, 1907. A subdivision of *Trimerocephalus*. Devonian.
Genotype *Trinucleus laevis* Münster.

Fialoides Hadding, 1914. 1 sp. A cranidium figured which might be compared with *Amphoton steinmanni* Lorenz. Ordovician.
Genotype *F. antiquatus*.

Forbesia McCoy, 1846. Preoccupied. Silurian (Upper Ludlow).
Genotype *F. latifrons*.

Frammia Holtedahl, 1914.
Genotype *F. dissimilis*.

Geniacanthus Corda, 1847. See *Sao*.

Geniopleura Corda, 1847. See *Cyphaspis*.

Georgiellus Moberg, 1899. = *Elliptocephala*. Cambrian.

Gerasaphus Clarke, 1894. 1 sp. Ordovician.
Genotype *G. ulrichiana* Clarke.

Gerastos Goldfuss, 1843. 7 sp. = *Proetus*. Devonian.

Giordanella Bornemann, 1891. 3 sp. Cambrian.
Genotype *Illaenus meneghinii* Bornemann.

Glaphurus Raymond, 1905. 1 sp. Ordovician.
Genotype *Arionellus pustulatus* Wallcott.

Glockeria Wedekind, 1914, 3 sp. Devonian.
Genotype *G. glockeri* Barrande.
Mclearn, 1918, referred it to *Phacopina* Reed, 1905.

Goldius DeKoninck, 1841. 131 sp. Ordovician, Devonian.
Genotype *G. flabellifer*.

Goniodiscus Raymond, 1896. Cambrian.
Genotype *Agnostus lobatus* Hall.

Goniurus Raymond, 1913, 4 sp. Ordovician.
Genotype *Bathyurus perspicator* Billings.

Grifithides Portlock, 1843. 53 sp. Carboniferous.
Genotype *G. globiceps;* no genotype published.

Hanburia Walcott, 1 sp. Cambrian.
Genotype *H. gloriosa* Walcott.

Haploconus Raymond, 1913. 3 sp. Ordovician.
Genotype *Bathyurus smithi* Billings.

Harpes Goldfuss, 1839. 30 sp. Fam. Harpeidae Corda. Ordovician 10 sp., Silurian 14 sp., Devonian 6 sp.
Genotype *Trilobites ungula* Sternberg.

Harpidella McCoy. See *Cyphaspis.*

Harpides Beyrich, 1846. 8 sp. Ordovician.
Genotype *H. hospes* Beyrich.

Harpina Novak. See *Eoharpes.* 1 sp.

Harrisia Cleland. 1sp. Ordovician.
Referred to *Clelandia* by Crossman.

Hartshillia Illing, 1915.
Genotype *Holocephalcria inflata* Hicks.

Harttella Matthew, 1885. Cambrian.
Genotype *Conocephalites matthewi* Hartt.

Harttia Walcott, 1884. Cambrian.
Genotpye *H. matthewi* Walcott.

Hausmannia Hall & Clarke. 4 sp. Devonian.
Genotype *Dalmanites (Hausmannia) caudatus.*

Heiloproetus Rud. & E. Richter. 3 sp. Devonian.
Genotype *Proetus (Heiloproctus) ebersdorfensis.*

Heliomera Raymond, 1905. 1 sp. Ordovician.
Genotype *Cheirurus sol* Billings.

Hemiarges Gürich. 1 sp. Ordovician.
Genotype *Lichas wesenbergensis* Schmidt.

Hemicrypturus Green. See *Asaphus expansus* and *Calymene clintoni.*

Hemigyraspis Raymond, 1918. 8 sp. Ordovician.
Genotype *Isotelus affinis* McCoy.

Hemisphaerocoryphe Reed, 1896. 3 sp. Ordovician.
Genotype *Sphaerexochus pseudohemicranium* Nieszk.

Herse Corda, 1847. = *Agraulos* Corda.

Hicksia Delgado 1904. 9 sp. Cambrian.
Genotype *H. elvensis* Delgado.

Hoeferia Redlich, 1901. = *Redlichia.*

Holasaphus Matthew, 1895. 7 sp. Cambrian.
Genotype *H. centropyge* Matthew.

Holemeris Corda, 1847. See *Bronteus*.

Holmia Matthew, 1890. 4 sp. Cambrian.
Genotype *Paradoxides kjerulfi* Linrs.

Holocephalina Salter, 1864. 2 sp. Cambrian.
Genotype *H. primordialis* Salter.

Holometopus Angelin 1854. 8 sp. Ordovician.
Genotype *H. limbatus* Angelin.

Holotrachellus Linnarsson mss., Holm, 1898. = *Illaenus*.

Homalonotus Koenig, 1825. Ordovician, Silurian, Devonian.
Genotype *H. knighti* Koenig.

Homalops Remele, 1855. = *Phacops*.

Homalopteon Salter, 1866. 3 sp. Subgenus of *Barrandia*. Ordovician.
Genotype *Ogygia portlocki* Salter.

Homoglossa Raymond, 1912. 1 sp. Ordovician.
Genotype *Ogygia dilatata panderi* Schmidt.

Homolichas Schmidt, 1885. 6 sp. Ordovician.
Genotype *Lichas depressus* Angelin.

Homotelus Raymond, 1920. 7 sp. Ordovician.
Genotype *H. ulrichi*.
Derived from *Isotelus* for species partly referred to *Onchometopus*.

Hoplolichas Dames, 1872. 10 sp. & var. Ordovician, Silurian.
Genotype *Lichas tricuspidatus* Beyrich.

Housia Walcott, 1916. 1 sp. Cambrian.
Genotype *Dolichometopus* (Housia) varro Walcott.

Hungia Walcott, 1913. Ozarkian.
Genotype *H. billingsi* Walcott.

Hyboaspis Raymond, 1920. 1 sp. Ordovician.
Genotype *H. shuleri* Raymond.

Hydrocephalus Barrande, 1846. 2 sp. = *Paradoxides*.

Hydrolenus Salter, 1866. Ordovician.
Genotype *Illaenus* (*Hydrolenus*) *conifrons*. Raymond, 1916, remarks that the genotype belongs to the older genus *Thalcops*, therefore the genus should be dropped.

Hypagnostus Jaekel, 1909. Cambrian.
Genotype *Agnostus parvifrons* Linnarsson.

Hysterolenus Moberg, 1898. 2 sp. Cambrian.
Genotype *H. törnquisti* Moberg.

Hystricurus Raymond, 1913. 4 sp. Ordovician.
Genotype *Bathyurus conicus* Billings.

Illaenoides Weller, 1903. 2 sp. Silurian.
Genotype *I. trilobus* Weller.

Illaenopsis Salter, 1866. 2 sp. Ordovician (Lower Llandeilo).
Genotype *I. thompsoni* Salter.

Illaenurus Hall, 1863. 9 sp. Upper Cambrian and Early Ordovician.
Genotype *I. quadratus* Hall.

Illaenus Dalman, 1826. 125 sp. Cambrian, Ordovician, Silurian.
Genotype *Entomostracites crassicauda* Wahlenberg.

Inouyia Walcott, 1911. 10 sp. Cambrian.
Genotype *Agraulos? capax* Walcott.

Isocolus Angelin, 1854. Ordovician.
Genotype *I. sjögreni* Angelin. A blind genus incompletely known.

Isoteloides Raymond, 1910. 4 sp. Fam. Asapridae. Ordovician.
Genotype *Isotelus whitfieldi* Raymond.

Isotelus DeKay, 1824. 29 sp., 1 var. Fam. Asaphidae. Ordovican.
Genotype *I. gigas* DeKay.

Jonotus von Meyer. See *Harpes*. Devonian.

Karlia Walcott. See *Corynexochus*. 2 sp.

Kawina Barton, 1915. 5 sp. Ordovician.
Genotype *Cheirurus vulcanus* Billings.

Kjerulfia Kiaer, 1916. Cambrian.
Genotype *K. lata* Kiaer.

Koenigia=*Homalonotus*.

Kootenia Walcott, 1888. Cambrian.
Genotype *Bathyuriscus* (*Kootenia*) *dawsoni* Walcott.

Lehua Barton, 1913. 3 sp. Ordovician.
Genotype *Cheirurus vinculum*.

Leiagnostus Jaekel, 1901, = *Phalacroma*.

Leiolichas Schmidt, 1885. 2 sp. Ordovician.
Genotype *Platymetopus illaenoides* Nieszkowski.

Leiostegium Raymond, 1913. 2 sp. Ordovician.
Genotype *Bathyurus quadratus* Billings.

Lejopyge Corda, 1847. Cambrian.
Genotype *Battus laevigatus* Dalman.

Leonaspis Rud. & E. Richter, 1917.
Genotype *Acidaspis* (*Leonaspis*) *leonhardi* Barrande.

Leptoplastus Angelin, 1854. 10 sp. Cambrian.
Genotype *L. stenotus* Angelin.

Levisia Walcott, 1911. 5 sp. Cambrian.
Genotype *Agraulos agenor* Walcott.

Lichapyge Callaway, 1877. 2 sp. Silurian (Middle Bala).
Genotype *L. cuspidata* Callaway.

Lichas Dalman, 1826. 69 sp. Ordovician, Devonian.
Genotype *Entomostracites wahlenbergi.*

Liocalymene Raymond, 1916, 1 sp. Silurian.
Genotype *Hemicrypturus clintoni* Vanuxem.

Liocephalus Gronwall, 1902. 6 sp. Cambrian.
Genotype *Conocoryphe impressus* Linnarsson.

Lioparia Lorenz, 1906, = *Anomocare.*

Liostracina Monke, 1903. 1 sp. Cambrian.
Genotype *L. krausei* Monke.

Liostracus Angelin, 1854. 22 sp., 4 var. Cambrian.
Genotype *L. aculeatus* Angelin.

Liparges Gürch, 1901. = *Corydocephalus.*

Lisania Walcott, 1911. 6 sp. Cambrian.
Genotype *Anomacarella? bura* Walcott.

Lloydia Vogdes, 1890. 5 sp. Ordovician.
Genotype *Bathyurus bituberculatus* Billings.

Loganellus Devine, 1863. 1 sp. Cambrian.
Genotype *L. quebecensis* Devine.

Lonchocephalus Owen, 1852. 15 sp. Cambrian.
Genotype *L. chippewaensis* Owen.

Lonchodomus Angelin, 1854, 15 sp. Cambrian.
Genotype *Ampyx rostratus* Sars.

Macrotoxus Lorenz, 1901, = *Conaspis.*

Malladaia Oehlert, 1896. 1 sp. Devonian.
Genotype *Cryphaeus (Malladaia) luciae.*

Marella Walcott, 1912. 2 sp. Cambrian.
Genotype *M. splendens* Walcott.

Marjumia Walcott, 1916. 4 sp. Cambrian.
Genotype *M. typa* Walcott.

Maryvillia Walcott, 1916. 2 sp. Cambrian.
Genotype *M. typa* Walcott.

Maryvilla Walcott, 1916. 2 sp. Cambrian.
Genotype *M. arion* Walcott.

Megalaspides Brögger, 1896. 4 sp. Ordovician.
Genotype *M. dalecarlicus* Holm.

Megalaspis Angelin, 1854. 58 sp., 17 vars. Ordovician.
Genotype *M. gigas* Angelin.

Megalophthalmus Lorenz, 1906, = *Anomocare*.

Meneghinella Bornemann, 1891. 1 sp. Cambrian.
Genotype *M. serrata* Bornemann.

Menocephalus Owen, 1852. 10 sp. Cambrian.
Genotype *M. minnesotensis* Owen.

Menomonia Walcott, 1916. 1 sp. Cambrian.
Genotype *Conocephalites calymenoides* Whitfield.

Mesagnotus Jaekel = *Agnostus* and *Peronopsis*.

Mesonacis Walcott, 1885. 3 sp. Cambrian.
Genotype *Olenus vermontanus* Hall.

Mesopheniscus Corda = *Agnostus*.

Metacanthus Corda, 1847, = *Dalmanites*.

Metadoxides Bornemann, 1891.
Genotype *Paradoxides torosus* Meneghini.
Subgenera:
Catadoxides. Type *C. magnificus* Matthew. 1 sp.
Metadoxides ss. Type *M. torosus*. 1 sp.
Anadoxides. Type *A. armatus*. 1 sp.

Metalichas Reed, 1902. 4 sp.
Genotype *Lichas cicatricosus* Schmidt, not Lovén.

Metopias Eichwald, 1842, not Gory. 1832, in Coleoptera, = *Metopolichas*.

Metopolichas Gürich, 1901, for *Metopias*, preoccupied. Ordovician.
Genotype *M. hubneri* Eichwald.

Miagnostus Jaekel, 1901, = *Lejopyge*.

Micmacca Matthew ,1895. 9 sp., 2 var. Cambrian.
Genotype *M. matthersi* Matthew.

Microdiscus of outhors = *Lonchodomus*, and included species of *Eodiscus* and *Goniodiscus*.

Microparia *Corda*, 1847. See *Aeglina* Barrande.

Micropyge Corda, 1847. See *Sao*.

Millardia Walcott, 1916. 3 sp. Cambrian.
Genotype *M. semele* Walcott.

Miraspis Rud. & E. Richter, 1917.
Genotype *Acidaspis* (*Miraspis*) *mira*.

Mohicana Cobbold, 1910. 2 sp. Cambrian.
Genotype *M. lata* Cobbold.

Mollisonia Walcott, 1912. 1 sp. Cambrian.
Genotype *M. symmetrica* Walcott.

Monadina Corda = *Sao*.

Monorhachis Schmidt, 1886. 2 sp. Devonian?
Genotype *Phacops* (*Monorhachis*) *lepatini*.

Nathorstia Walcott, 1912. 1 sp. Cambrian.
Genotype *N. transitans* Walcott.

Nattainia Eaton, 1832. See *Cryptolithus*.
Portlock, 1843, used this name for *Lichas hibernicus*.

Neolenus Matthew, 1890. 6 sp. Cambrian.
Genotype *Ogygia serrata* Rominger.

Neseuretus Hicks, 1872. Cambrian, Tremadoc.
Genotype *N. ramseyensis* Hicks.

Nevadia Walcott, 1910. 1 sp. Cambrian.
Genotype *N. weeksi* Walcott.

Nieszkowskia Schmidt, 1881. 9 sp. Ordovician, Silurian.
Genotype *Sphaeroxochus cephalocera* Nieszkowski.

Nileoides Raymond, 1920. 1 sp. Ordovician.
Genotype *N. perkinsi*.

Nileus Dalman, 1826. 12 sp., 2 var. Ordovician.
Genotype *Aspahus* (*Nileus*) *armadillo* Dalman.

Niobe Angelin, 1852. 16 sp. Ordovician, Tremadoc.
Genotype *N. lata* Angelin.

Norwoodia Walcott, 1916. 5 sp. Cambrian.
Genotype *N. gracilis* Walcott.

Notasaphus Gregory, 1903. Cambrian.
Genotpye *N. fergusoni* Gregory.

Octillaenus Salter, 1867. 1 sp. Ordovician.
Genotype *Illaenus hisingeri* Barrande.

Odontocephalus Conrad, 1840. 4 sp. Devonian.
Genotype *Dalmanites* (*Odontocephalus*) *selenurus*.

Odontochile Corda, 1847. Preoccupied, 1834, in Coleoptera.
Genotype *O. applanata* Corda.

Odontopleura Emmrich, 1839. 57 sp. Ordovician, Silurian.
Genotype *O. ovata* Emmrich.

Odontopyge Corda, 1847. Cambrian.
Genotype *Olenus gibbosus* Dalman, part.

Ogygia Brongniart, 1822. 24 sp. Cambrian, Silurian. Preoccupied in *Lepidoptera* in 1822. Replaced by *Ogygiocaris* Angelin, 1854.

Ogyginus Raymond, 1912. Ordovician.
Genotype *Asaphus corudensis* Murchison.

Ogygiocaris Angelin, 1854. 3 sp., 5 var. Ordovician, Cambrian.
Genotype *Trilobus dilatatus* Brunnich.

Ogygites Tomelin & Lebesconte, 1876. 29 sp.
Genotype *Ogygia guettardi* Brongniart.

Ogygopsis Walcott, 1888. 1 sp. Cambrian.
Genotype *Ogygia klotzi* Rominger.

Olenelloides Peach, 1894. 1 sp.
Genotype *O. armatus* Peach.

Olenellus Hall, 1860. 17 sp. Cambrian.
Genotype *Barrandia thompsoni* Hall.

Olenoides Meek, 1877. 5 sp. Cambrian.
Genotype *Paradoxides? nevadensis* Meek.

Olenopsis Bornemann, 1891. 11 sp. Cambrian.
Genotype *Olenus zoppii* Meneghini.

Olenus Dalman, 1827. 20 sp., 1 var. Cambrian or later.
Genotype *Entomostracites gibbosus.*

Oncholichas Schmidt, 1885. 4 sp. Silurian.
Genotype *Lichas ornatus.*

Onchometopus Schmidt, 1898. 5 sp. Ordovician.
Genotype *O. volborthi.* Nine species have been referred to this genus, four of which Raymond referred to *Homotelus* gen. nov.

Onycopyge Woodward, 1880. 1 sp. Cambrian.
Genotype *O. liversidgei* Woodward.

Orinops Rafinesque, 1832, = *Calymene.*

Orometopus Brögger, 1896. 2 sp. Ordovician.
Genotype *Holometopus? elatifrons* Angelin.

Orria Walcott, 1916. 1 sp. Ordovician.
Genotype *O. elegans* Walcott.

Oryctocare Walcott, 1908. 1 sp. Cambrian.
Genotype *O. geikiei* Walcott.

Oryctocephalus Walcott, 1886. 4 sp. Cambrian.
Genotype *O. primus* Walcott.

Osceolia Walcott, 1914. 1 sp. Upper Cambrian.
Genotype *Dikelocephalus osceola* Hall.

Otarion Zenker, 1833.
A heterogeneous assembly of species belonging in part to the genera *Ceraurus, Conocoryphe,* and *Synhomalonotus.*

Owenella Walcott = *Marjumia.*

Paedumias Walcott, 1910. 1 sp. Cambrian.
Genotype *P. transitans* Walcott.

Pagetia Walcott, 1916. 2 sp. Fam. Eodiscidae. Cambrian.
Genotype *P. bootes* Walcott.

Pagodia Walcott, 1905. 4 sp. Upper Cambrian.
Genotype *P. lotus.*

Pagura Emmons = *Bathynotus.*

Palaeolenus Mansuy, 1912. 3 sp.
Genotype *P. douvillei* Mansuy.

Palaeopyge Salter, 1856. 1 sp. Cambrian.
Genotype *P. ramsayi* Salter. A very doubtful genus.

Panderia Volborth, 1863. 13 sp. Ordovician.
Genotype *P. triquetra* Volborth.

Parabolina Salter, 1849. 17 sp., 2 var. Cambrian.
Genotype *Entomostracites spinulosus* Wahlenberg.

Parabolinella Brögger, 1882. 13 sp... Cambrian.
Genotype *P. limitis* Brögger.

Parabolinopsis Boeck, 1912.
Genotype *P. mariana* Hoek.

Paradechenella Richter, 1912. Devonian.
Genotype *Dechenella* (*Paradechenella*) *tschernyschewi.*

Paradoxides Brongniart, 1822. 46 sp., 10 var. Cambrian.
Genotype *P. tessini* Brongniart.

Paragnostus Jaekel, 1909. See *Condylopyge.*

Parahomalonotus Reed, 1918. 8 sp. Devonian.
Genotype *Homalonotus* (*Parahomalonotus*) *gervillei.*

Paralejurus Corda, 1847. See *Bronteus.*

Paralichas Reed, 1902. 5 sp. See *Amphilichas.*

Peachella Walcott, 1910. 1 sp. Cambrian.
Genotype *Olenellus iddingsi* Walcott.

Pectunculites Hermann, 1711.
The earliest description of a Trilobite of the genus *Encrinurus.*

Peltura Milne-Edwards, 1840. 10 sp., 3 var. Cambrian.
Genotype *Entomstracites scarabaeoides* Wahlenberg.

Pemphigaspis Hall, 1863. 15 sp. Cambrian.
Genotype *P. bullata* Hall.

Pennaia Clarke, 1913. Devonian.
Genotype *P. pulliana* Clarke.
A very distinct variation of the Mesembria type of *Dalmanites.*

Peronopsis Corda, 1947. Cambrian.
Genotype *Battus integer* Beyrich.

Petigurus Raymond, 1913. 2 sp. Ordovician.
Genotype *Bathyurus nero* Billings.

Phacopidella Reed, 1903. 12 sp. Devonian.
Genotype *Phacops glockeri* Barrande.

Phacopina Clarke, 1913. 4 sp. Devonian.
Genotype *Phacops brasiliensis* Clarke.

Phacops Emmrich, 1839. About 133 sp. Ordovician, Silurian, Devonian.
Genotype *Phacops latifrons* Bronn.

Phaethonides Angelin, 1854, 13 sp. (8 sp. to *Cordania*) Devonian.
Genotype *P. archiaci* Angelin.

Phaeton Barrande, 1846, not of Brisson, 1770. Changed to *Prionopeltis*.

Phaetonellus Novàk, 1890. 4 sp. Devonian, (f/2).
Genotype *Proctus* (*Phactonellus*) *planicauda rhenanus*.

Phalacroma Corda, 1847. Cambrian.
Genotype *Calymene pulchra* Barrande.

Phanoptes Corda, 1847. See *Paradoxides*.

Pharostoma Corda, 1847. 6 sp. Ordovician.
Genotype *Calymene pulchra* Barrande.
Synonym of *Prionocheilus* Rouault.

Phillipisa Portlock, 1843. About 90 sp., 3 var. Carboniferous.
Genotype *Asaphus gemmuliferus* Phillips.

Phillipsinella Novàk, 1885. 1 sp. Ordovician.
Genotype *Phillipsia parabola* Barrande.

Phlysaceum Corda, 1847, = *Paradoxides*.

Phyllaspis Richter, 1863. 1 sp. Devonian.
Genotype *P. raniceps*.

Pilekia Barton, 1915. 4 sp. Ordovician.
Genotype *Ch. apollo* Billings.

Piliolites Cozzens, 1846, = *Proetus*.

Placoparia Corda, 1847. 4 sp. Ordovician.
Genotype *P. zippei* Boeck.

Plaesiacomia Corda, 1947. Referred to *Homalonotus*.

Platopolichas Gürich, 1901. 9 sp., 1 var. Ordovician.
Genotype *P. margaritifera* Nieszkowski.

Platycolpus Raymond, 1913. 7 sp. Ordovician.
Genotype *Bathyurus capax* Billings.

Platymetopus Angelin, 1854. 12 sp. Preoccupied, see *Amphilichas*.

Platynotus Conrad, 1839, not Fabricius 1801, in Coleoptera = *Arctinurus*.
Genotype *Paradoxides boltoni*.

Platypeltis Callaway, 1874. 3 sp.
Genotype *Asaphus* (*Platypeltis*) *crofftii* Callaway.

Plethopeltis Raymond, 1913. 2 sp. Cambrian.
Genotype *Agraulos saratogensis* Walcott.

Pleuracanthus Milne-Edwards, 1840, = *Dalmanites*.

Pleuroctenium Corda, 1847. Cambrian.
Genotype *Battus granulatus* Barrande.

Pliomera Angelin, 1852. 11 sp.
Genotype *Amphion fischeri* Eichwald.
Subgenus:
Encrinurella Reed, 1915.
Genotype *Pliomera* (*Encrinurella*) *insangensis* Reed.

Pliomerops Raymond, 1918. Ordovician.
Genotype *Amphion canadensis* Billings.

Plusiarges Gürich, 1901, preoccupied. See *Corydocephalus*.

Plutonia Hicks, 1871, = *Paradoxides*.

Poliella Walcott. 9 sp. Cambrian.
Genotype *Bathyuriscus* (*Poliella*) *anteros*.

Polyeris Rouault, 1846. = *Odontopleura*.

Polytomurus Corda, 1847, = *Dionide*.

Porcelliana Isberg, 1917. 1 sp. Ordovician.
Genotype *P. longicornis*.

Portlockia McCoy, 1843. 3 sp. = *Acaste*.

Primaspis Rud. & E. Richter, 1917. Ordovician.
Genotype *Acidaspis* (*Primaspis*) *primordialis* Barrande.

Prinopeltis Corda, 1847. 5 sp. Devonian.
Genotype *P. archaica* Barrande.

Prionocheilus Rouault, 1846, = *Calymene*.

Proampyx Frech, 1902. 3 sp. Cambrian.
Genotype *Anomocare acuminatum* Angelin.

Probolium Oehlert, 1889. 7 sp. Devonian.
Genotype *Dalmanites* (*Probolium*) *galloisi*.

Proboloides Clarke, 2 sp. Devonian.
Genotype *P. cuspidatus Clarke*.

Proceratopyge Wallerius, 1895. Cambrian.
Genotype *P. conifrons* Wallerius.

Proetus Steininger, 1831. Over 200 sp. (226?). Ordovician, Silurian, Devonian, Carboniferus.
Genotype *P. cuvieri* Steininger.
Richter divides the Devonian representatives into 9 subgenera, *Drevermannia, Cyrtosymbole, Typhroproctus, Pteroparia, Euproctus, Proctus* s. s., *Astycoryphe, Eremiproctus, Cornuproctus*.

Prosopiscus Salter. Fam. Cheiruridae Barton. Middle Ordovician.
Genotype *P. minus* Salter.

Protagraulos Matthew, 1895. 1 sp. Cambrian.
Genotype *P. priscus* Matthew.

Protolenus Matthew, 1892. 9 sp. Cambrian.
Genotype *P. paradoxides* Matthew.

Protolichas Reed, 1902. Reed used this name for his first group of the Lichadidae.

Protopeltura Brögger, 1882. 5 sp., 2 var. Cambrian.
Genotype *P. acuthura* Brögger.

Protypus Walcott, 1886. 3 sp. Cambrian, Ordovician.
Genotype *Angelina hitchcocki* Whitfield.

Pseudagnostus Jaekel, 1909. Cambrian.
Genotype *Agnostus cyclopyge* Tullberg.

Pseudophillipsia Gemmellaro, 1890. 2 sp. Carboniferous.
Genotype *P. elegans.*

Pseudosphaerexochus Schmidt, 1881. 11 sp. Ordovician, (C 1/b).
Genotype *Sphaerexochus hemicranium* Kutorga.

Psilocephalus Salter, 1866. 2 sp. Lower Tremadoc.
Genotype *P. innotatus* Salter.

Pterocephalia Roemer, 1849. 6 sp. Cambrian.
Genotype *P. sancti-sabae* Roemer.

Pterolichas Gürich, 1901, = *Arctinurus* Castelnau.

Pteroparia Richter, 1913. 1 sp. Devonian.
Genotype *P. columbella* Richter.

Pterygometopus Schmidt, 1881.
Genotype *Calymene sclerops* Dalman.

Ptychagnostus Jaekel, 1909. Cambrian.
Genotype *Agnostus punctulosus* Angelin.

Ptychaspis Hall, 1863. 22 sp. Cambrian.
Genotype *Dikelocephalus miniscaensis* Owen.

Ptychocheilus Novak, 1883. 2 sp. Ordovician.
Genotype *Ogygia discreta* Barrande.

Ptychoparia Corda, 1847. Cambrian.
Genotype *Conocephalus striatus* Emmrich.

Ptychopyge Angelin, 1854. 28 sp., 5 var. Ordovician.
Genotype *P. glabrata* Angelin.

Radiaspis Richter. Devonian.
Genotype *Acidaspis* (*Radiaspis*) *radiata* Goldfuss.

Raphiophorus Angelin, 1854, = *Ampyx.*

Redlichia Crossman, 1902. 7 sp. Cambrian.
Genotype *Hoeferia noetlingi* Redlich.

Reedia Wedekind, 1911, 11 sp. Silurian.
Genotype *Phacops* (*Reedia*) *bronni.*

Remopleurides Portlock, 1843. 19 sp., 1 var. Cambrian, Ordovician.
Genotype *R. colbyi.*

Rhinaspis Remelé, 1885.
Genotype *R. erratica* Remelé.

Rhodope Angelin, 1854, not of Koll, 1847, = *Illaenus.*

Robergia Wiman, 1902. 1 sp., 1 var. Cambrian.
Genotype *Remopleurides microphthalmus* Linnarsson.

Salteria Thompson, 1864. 2 sp. Cambrian.
Genotype *S. primaeva* Thompson. Genus closely related to *Dionide.*

Salteria Walcott, 1884, = *Bailiella.*

Sao Barrande, 1846. 2 sp. Cambrian.
Genotype *Sao hirsuta* Barrande.

Saratogia Walcott, 1916. 10 sp. Cambrian.
Genotype *S. calcifera* Walcott.

Sarkia Kloucek, 1920. Ordovician.
Genotype *S. bohemica.*

Saukia Walcott, 1914. 13 sp. Cambrian.
Genotype *Dikelocephalus lodensis* Whitfield.

Schantungia Lorenz, 1906. 4 sp. not of Walcott, 1905.

Schizoproetus Richter, 1913. Fam. Aeonidae. Devonian.
Genotype *S. celechovensis.*

Schizopyge Clarke, 1890. 3 sp. Devonian.
Genotype *Homalonotus* (*Schizopyge*) *paraná* Clarke.

Schmalenseeia Moberg, 1903. 1 sp. Cambrian.
Genotype *S. amphionura* Moberg.

Schmidtella Tschernyschew, 1893. 2 sp. Devonian.
Genotype *S. uralica.*

Schmidtella Matthew, 1895. For a genus of Ostracoda.

Schmidtia Moberg, 1890, = *Mesonacis.*

Schmidtiellus Moberg & Segerberg, 1906, = *Mesonacis.*

Selenopeltis Corda, 1847, 1 sp. = *Acidaspis.*

Selenopychus Corda, 1847, = *Aeglina.*

Shantungia Walcott, 1905. 2 sp. Cambrian.
Genotype *S. spinifer* Walcott.

Shumardia Billings, 1865. 10 sp., 1 var. Cambrian.
Genotype *S. granulosa* Billings.

Skemmatopyge Rud. & E. Richter, 1 sp. Devonian.
Genotype *S. tietzeri* Richter.

Solenopleura Angelin, 1854. 34 sp., 4 var. Cambrian.
Genotype *S. holometopa* Angelin.

Somatrikopon M. Murtrie, 1819. Devonian.
Genotype *S. megalomaton* (Phacops rana).
The author's description, although suggesting a *Phacops*, is very obscure, and without illustration of the genus. This early description of a *Phacops* can be adopted only by the same courtesy which was given by many authors to Murchison's *Trinucleus*.

Sphaerexochus Beyrich, 1845. 23 sp. Ordovician, Silurian.
Genotype *S. mirus* Beyrich.

Sphaerocoryphe Angelin, 1854. 12 sp. Ordovician.
Genotype *S. dentata* Angelin.

Sphaerophalmus Angelin, 1854. 8 sp. 1 var. Cambrian, Ordovician, Silurian.
Genotype *S. flagellifer* Angelin.

Staurocephalus Barrande, 1846. 6 sp. Silurian.
Genotype *Trochurus speciosus* Beyrich.

Staurogmus Corda, 1847. See *Sao*.

Stephanocare Monke, 1903. 4 sp. Camrbian.
Genotype *S. richthofeni*. Monke.

Strenuella Matthew, 1887. 5 sp., 2 var. Fam. Conocoryphidae, Cambrian.
Genotype *Agraulos strenuus* Billings.

Stygina Salter, 1853. 2 sp., Fam. Styniginidae Raymond. 1920. Ordovician.
Genotype *Asaphus latifrons* Portlock.

Symphysurus Goldfuss, 1843. 16 sp. Ordovician.
Genotype *Asaphus palpebrosus* Dalman.

Synhomalonotus Pompeckj, 1898. 7 sp., 1 var. Cambrian.
Genotype *Calymene tristani* Brongniart.

Synphoria Clarke, 1890. 3 sp., 1 var. Devonian.
Genotype *Dalmanites* (*Synphoria*) *stemmatus*.

Teinistion Monke, 1903, 4 sp. Cambrian.
Genotype *T. lansi* Monke.

Telephus Barrande, 1852, 9 sp. Ordovician.
Genotype *T. fractus* Barrnade.

Terataspis Hall, 1863. 2 sp. Fam. Lichadidae. Devonian.
Genotype *T. grandis*.

Teratorhynchus Reed, 1904. Ordovician.
Genotype *Remopleurides* (*Teratorhynchus*) *bicornis* Reed.

Tetracnemis Corda, 1847, = *Sao*.

Thaleops Conrad, 1843. 4 sp. Ordovician.
Genotype *T. ovatus* Conrad.

Thyphoproetus Frech, 1913. 2 sp. Devonian.
Genotype *T. microdiscus*.

Thysanopeltis Corda, 1847. 13 sp.
Genotype *Bronteus thysanopsis*.

Thysanopyge Kayser, 1898. Ordovician.
Genotype *T. argentina*.

Tiresias McCoy, 1846. Cranidium only known. Reed, 1898, says it seems to be allied to *Ampyx*.

Toernquistia Reed, 1904. Ordovician, Llandeilo.
Genotype *Cyphaspis* (*Törnquistia*) *nicholsoni* Reed.

Toxotis Wallerius, 1895. Cambrian.
Genotype *T. pusilla* Wallerius.

Trachylichas Gürich, 1901, = *Dicranopeltis*.

Trachyostracus Lorenz, 1906. Contains a mixture of generic forms.

Tramoria Reed, 1899. Ordovician.
Genotype *T. punctata*. The author abandoned the genus and referred the species to *Apatokephalus*.

Trapelocera Corda, 1847. 3 sp. Silurian.
Genotype *Acidaspis vesiculosa* Beyrich.

Tretaspis McCoy, 1849. 3 sp. Ordovician.
Genotype *Asaphus seticornis* Hisinger.

Triarthrella Hall, 1863. Cambrian.
Genotype *T. auroralis* Hall.

Triarthrus Green, 1832. 10 sp., 2 var. Ordovician.
Genotype *T. beckii* Green.

Trigonaspis Sanderberg, 1850, = *Proctus*.

Trigonocephalus Zenker, 1833. = *Conocephalites*, now also abandoned.

Trimerocephalus McCoy, 1849. Devonian.
Genotype *Trinucleus lacvis* Münster.
Gortani, 1907, divides the genus into two subgenera:
1. *Trimerocephalus* (*Microphthalmus*) Type *T. cryptophthalmus*, 7 sp.
2. *Trimerocephalus* (*Eutrimerocephalus*) Type *T. lacvis*, 4 sp.

Trimerus Green, 1832. 4 sp. = *Homalonotus*.

Trinucleus Llwyd, Murchison, 1839. See *Cryptolithus* Green, 1832

Trochurus Beyrich, 1845, = *Staurocephalus.*

Trochurus Lindström, 1885, (3 sp. Silurian) and *Corydocephalus* are confused.
Genotype *T. pusillus* Angelin.

Tropidocoryphe Novàk, 1890. 7 sp. Devonian.
Genotype *T. filicostata.*

Tsinania Walcott, 1914. 3 sp. Cambrian.
Genotype *Illaenurus canens* Walcott.

Tyloproetus Rud. & E. Richter, 1913. 2 sp. Devonian.
Genotype *T. schindewolfi.*

Typhloniscus Salter, 1852. Devonian.
Genotype *T. bainii.*

Uralichas Delgado, 1892. Silurian.
Genotype *Lichas (Uralichas) ribeiroi* Delgado.

Vanuxemella Walcott, 1908. 2 sp. Cambrian.
Genotype *V. contracta Walcott.*

Vogdesia Raymond, 1910. 2 sp. Ordovician.
Genotype *Isotelus bearsi.* The genus is closely related to *Homotelus* and *Brachyaspis.*

Wanneria Walcott, 1910. 3 sp. Cambrian.
Genotype *Olenellus (Holmia) walcottanus* Wanner.

Wessekia Raymond, 1916.
Genotype *Illaenus katzeri* Barrande.

Weymouthia Raymond, 1913. Cambrian
Genotype *Agnostus? nobilis* Ford.

Xiphogonium Corda, 1847. 5 sp. Devonian.
Genotype *X. lovéni* Barrande.

Youngia Lindström, 1885. 4 sp. Silurian, Devonian.
Genotype *Cheirurus trispinosus* Young.

Zacanthoides Walcott, 1888. 11 sp. Cambrian.
Genotype *Olenoides speciosus* Walcott.

Zethus Pander, 1830.
Genotyve *Zethus verrucosus.*

Pander had a mere fragment and evidently intended to describe a species of *Cheirurus (Pseudosphaerexochus)* as the type of his genus. The name cannot be accepted for *Cybele* or *Cheirurus* without creating confusion, as Salter remarked in 1855.

Pander's collection, Academy of Science, St. Petersburg, was destroyed by fire. Dr. Schmidt referred Pander's species to *Cybele bellatula,* Rev. 1, p. 203. In Rev. 6, 1907, he renamed it *Cybele panderi* and described it as a new species.

PART III.

A SUMMARY OF THE ORDOVICIAN GENUS CYBELE LOVEN

CHRONOLOGICAL BIBLIOGRAPHY

BRONGNIART, ALEXANDRE. Histoire Naturelle des Crustacés Fossiles, 1822, p. 145, pl. IV, fig. 11.

The author does not name the cephalon figured, but remarks that it differs from all the other described species. The figure was from a drawing by Mr. Stokes of a specimen found in the Llandeilo group in England (*Cybele verrucosa*).

DALMAN, J. W. K. Svensk. Vet.-Akad. Handl., No. 4, 1826, p. 285.

The author uses the name *Calymene verrucosa* for a species of *Cybele*.

This work was also published as Om Palaederna eller de sa kall de Trilobiterna, Stockholm, 1826, with 6 plates; also a German translation by Fried. Engelhart, Nürnberg, 1828.

Dalman describes *Calymene bellatula*, Palaederna, p. 43, pl. 1, fig. 4 a-d, from Husbyfjol, Ostergotland.

————Arsberatt Zool. Arbet., 1828, p. 134, foot-note.

The author describes *Calymene verrucosa* from a pygidium. Férussac, Bull. Sci. Geol., Vol. 19, 1829, gives a note of this paper.

VON SCHLOTHEIM, BARON E. F. Nachträge zur Petrefactenkunde, 1832, Petrik. III, pp. 40 & 86, pl. 22, fig. 5.

Trilobites velatus (referred to *Cybele verrucosa*).

ESMARCK, M. T. Om nogle nveArter af Trilobiter.—Mag. fur Naturvidensk, Ander Rakkes, Christiania, Vol. 1, 1833, p. 269, pl. 7, fig. 10.

Describes and figures a new species of *Cybele* as *Trilobites dentatus* from a pygidum which has four pairs of spined pleurae on the lateral lobes, and an axis with fifteen rings, excluding the tip.

BOECK, C. Uebersicht der bisher in Norwegen gefundenen formen der Trilobiten Familie, 1838.

The author gives (p. 139, No. 7), the following description of *Trilobites dentatus* Esmarck: The semicylindrical glabella, which is rounded at the anterior part, has three lateral furrows, and the genal angles terminate in spines like the pleurae of the thorax. Brögger referred this to *Cybele bellatula*.

EICHWALD, EDOUARD VON. Schichtensystem von Estland, 1840.

The author reviews the generic name *Cryptonymus*, 1825, genotype *Calymene punctatus*, and places certain species described under *Encrinurus* and *Cybele* under *Cryptonymus*. He named two new spcies, *Cryptonymus parallelus*, p. 73, (referred by Schmidt to *Panderia*) and *C. wörthi*.

PORTLOCK, J. E. Geological Report on Londonderry, &c., 1843, p. 302.

Describes under the genus *Ogygia* a new species of *Cybele* from the Irish Ordovician Schist of Tyrone at Desertcrest, *Ogygia rugosa* sp. nov.; description drawn from the pygidium.

LOVEN, S. Evensk Trilobiter.—K. Svensk Vet.—Akad., 1845, p. 110, pl. 1, 2.

Describes his new genus *Cybele* and cites three species, *Cybele bellatula* Dalman; *C. verrucosa* Dalman; *C. velata* Schlotheim.

McCoy, Frederick. Synopsis of the Silurian Fossils of Ireland, 1846, p. 47, pl. 4, fig. 12.

Calymene arenosa, referred to *Cybele* by Bigsby.

Burmeister, H. Organization of Trilobites, English Edition, 1846, p. 119, No. 5.

The author referred to Esmarck's paper Om nogle nye Arter af Trilobiter, 1833, pl. fig. 10. *Tr. dentatus,* a species with a large pygdium with a many jointed axis and three pairs of pleurae on the lateral lobes.

Corda, A. J. C. Prodrom einer Monographie der bömischen Trilobiten, 1847.

Describes and illustrates *Cybele bellatula* Dalm., and *Calymene verrucosa* Dalm., which he refers to his genus *Atractopyge.*

Volborth, A. von. Ueber einige Russischen Trilobiten.—Verhandl. Russ. Min. Ges., 1847, p. 1.

The author revives Pander's old generic name *Zethus* and describes and illustrates *Zethus verrucosus* Pander, referring to this species *Cryptoymus parallelus* and *Cybele bellatula* Lovén, with *Tril. velatus* Schloth. (Schmidt, Rev. 6, referred it to *Cybele panderi*). He also described and figured *Zethus bellatulus* Dalm., which is now referred to *Cybele wörthi* by Schmidt.

Angelin, N. P. Palaeontologia Scandinavica.—Part 1. Iconographia Crustaceorum Formationis Transitionis. Fasc. 1, 1851, pp. 24, plates 21. Part 2. Palaeontologia Schandinavica, 1854, pp. 92, plates 42.

Revised edition by Lindström, 1878, pp. 96, plates 42, with additional plates to replace Angelin's rejected ones.

The author revives Eichwald's older genus *Cryptonymus,* placing under it species now classed under *Encrinurus, Zethus* and *Cybele;* of the genus *Cybele,* such species as *Cryptonymus bellatulus* Dalm., *C. verrucosus* Dalm., *Cybele dentata* Esm. & *C. brevicauda* Ang.

Bronn, H. G. & Roemer, F. Lethaea Geognostica oder Abbildung und Beschreibung der für die Gebirge Formationen Bezeichnendsten Versteinerungen, Erster Band, 1851-1856, p. 654.

Zethus Pander, 1830; *Cybele* Lovén, 1845.

Zethus verrucosus Pander; *Cybele bellatula* Lovén.

Eichwald, Edouard von. Uber die Gattungen *Cryptonymus* und *Zethus* 1855.

The author remarks, p. 7, on changing the limits of *Cryptonymas,* 1825:

"Soon after my journey from Willna to St. Petersburg, I had the opportunity to renew my observations in the neighborhood of Zarskoje-Selo and Pawlowsk, and shortly afterwards on several occasions in Estland.

"My collection of trilobites consisted not only of the species which I had described, but also of many new forms. I referred the species, which had hitherto been classed under *Cryptonymus,* 1825, to *Illaenus,* for this genus had met universal acceptance, to the detriment of my *Cryptonymus.* In the year 1840 I gave to *Cryptonymus* a new signification and referred to it *Calymene punctatus* Dalm. and *C. variolaris* Brongniart in part, and added two new species, *Cryptonymus wörthi* and *C. parallelus.*

"In taking the well known *Calymene punctatus* Dalm. as the typical form for the genus, we gave a short description, reserving the exact diagnosis for the Palaeontology of Russia.

"It is possible for any person, who will decide impartially and generously with regard to the new limitation of the genus *Cryptonymus,* to readily perceive its characters from the type. Angelin, in his Monograph on the Swedish Trilobites, not only recognized my genus, but gave the generic formula."

On page 22 Eichwald remarks:

"The following is the position which I previously held and still advocate:

"First:—To maintain *Cryptonymus* as a genus for several Russian and Swedish trilobites, according to Angelin's diagnosis, which was derived from my short, but distinct description, given in my work on the Silurian System of Estland.

"Second:—To acknowledge *Zethus* Pander only as a genus for *Zethus uniplicatus*. This is the typical species given by the author, so we have no authority to take this species, which differs from all other trilobites, and class it under *Zethus verrucosus* which was doubtfully referred to this genus by Pander, and, by this combination, establish an independent genus.

"Third:—*Zethus verrucosus* Pander is probably *Cryptonymus verrucosus* Angelin, not *Crypt. parallelus* Eichw. or *Cybele bellatula* Lovén. *Z. bellatula* Volborth is a synonym of *Crypt. wörthi* and not of *Calymene punctata* Dalman, or of *variolaris* Brongniart."

Volborth, A. von Uber die prioritätsrechte der Trilobiten-Gattung *Zethus* Pander, gegen die *Cryptonymus* Eichwald.—Bull. Acad. Sci. de St. Petersb., Tom. 12, No. 19, 1855, pp. 251-262.

Referred Eichwald's genus *Cryptonymus* to *Zethus*.

Hoffmann, E. Sämmtliche bis jetzt bekannte Trilobite Russlands.—Verhandl. Russ. K. Min. Ges. Jahrgang, 1857-8, p. 31.

Under the genus *Zethus* the author describes *Cybele bellatula* Dalman, *C. verrucosa* Pander (referred by Schmidt to *C. bellatula*) and *Z. uniplicatus* Pander (referred to another genus).

Nieszkowski, J. Monograph of Baltic Trilbolites.—Archiv. für die Naturkunde Liv-Est.—und Kerlands, Bd. 1, 1857-59.

Gives a description of the genus *Encrinurus*, including *E. sexcostatus* Salter (referred doubtfully by Schmidt to *Cybele brevicauda*); also a description of the genus *Zthus* Pander, to which he referred *Zethus bellantula* Dalman (*Cybele bellautula*); *Z. res* sp. nov., 400 pl. fig. 3; *Z. atractopyge* McCoy (referred by Schmidt to *Cybele brevicauda* Angelin?); *Z. brevicauda* Ang.

Eichwald, Edouard von. Lethaea Rossica, ou Paléontologie de la Russie, Vol. 1, 1860, p. 1414.

Cryptonymus bellatula Dalman, p. 1414; *C. wörthi Eichw.*, p. 1416, pl. 54, fig. 17; *C. parallelus* Eichw., p. 1417, (referred by Schmidt to *Cybele panderi*).

Salter, J. W. &. Woodward, Henry. A Catalogue of the Cambrian and Silurian Fossils Contained in the Geol. Mus. Univ. Cambridge, 1863, p. 51.

Cybele verrucosa Dalm. (figured); *C. rugosa* Portl.

Salter, J. W. & Woodward, Henry. Chart of Fossil Crustacea with Descriptive Catalogue, 1865.

An entire figure of *Cybele verrucosa* Dalm., p. 12, No. 48.

Kjerulf, Theodor. Veiviser, 1865.

Gives in his list of fossils, p. 6, *Cybele dentata* Esm., which has been referred to *Cybele bellatula*.

Billings, E. Palaeozoic Fossils of Canada. Vol. 1, 1865.

On p. 292 the author describes, under *Cybele mirus*, the cephalon of an *Amphion* (*Pliomera*), and the pygidium of a *Cybele*.

Salter, J. W. & Woodward, Henry. The Geology of North Wales. Crustacea.—Mem. Geol. Sur., Vol. 3, 1866, p. 324, pl. 19, fig. 7, (head).

Cybele verrucosa.

Bigsby, John J. Thesaurus Siluricus, 1868, p. 45.

Refers *Calymene arenosa* McCoy to the genue *Cybele*.

Linnarsson, J. G. O. Vestergöthlands Cambiska & Siluriska Aflagringar, 1869, p. 62.

Describes and illustrates two new species, *Cybele aspera* and *C. lovéni,* with notes on *C. verrucosa.*

Etheridge, E. Geology of the Northern Lakes.—Mem. Geol. Sur. England & Wales, 1876, p. 112.

Describes *Cybele ovata* sp. nov. from the Skiddaw Slates.

The author gives no figure of this imperfect specimen, but remarks that it differs essentially from *Cybele rugosa* and *C. verrucosa,* which species are not known at present below the Caradoc rocks.

Postlethwaite in his paper on the Trilobites of the Skiddaw Slates, p. 465, figures it for the first time, pl. 8, fig. 17, 19.

Vogdes, A. W. Monograph of the Genera Zethus, Cybele, &c., 1878.

Under *Cryptonymus* the author describes and figures *C.* (*Cybele*) *rex* Nieszk; *C.* (*Cybele*) *bellatulus* Dalman; *C.* (*Cybele*) *atractopyge* McCoy (*Cybele verrucosa*), with figure; *C.* (*Cybele*) *brevicauda* Angelin; *C.* (*Cybele*) *dentatus* Esmarck; *C.* (Cybele) *wörthi* Eichwald; *C.* (*Atractopyge*) *mirus* Billings.

Nicholson, H. A. & Etheridge, R. A Monograph of the Silurian Fossils of the Girvan District in Ayrshire, Fasciculus 1, 1878, pp. 110-112.

Describes and figures *Cybele verrucosa* Dalman and *C. rugosa* Portlock (referred to *Cybele lovéni* by Reed).

Schmidt, F. Rev. 1, Ostbaltischen Silurischen Trilobiten, 1881, p. 197.

Describes and illustrates nine species of *Cybele,* including five new species, viz.:

Cybele bellatula Dalm., (afterwards, Rev. 6, referred in part to a new species, *Cybele panderi,* to which he refers *Zethus* Pander), p. 140, pl. 4, fig. 4; pl. 5, fig. 5; *Zethus verrucosa* Volborth, 1847, p. 8, pl. 1, fig. 5-7; *Cryptonymus parallelus* Eichwald, Leth. Ross, p. 1417, and *Cybele bellatula* Schmidt, Rev. 1, p. 2-3, pl. 13, fig. 9-13, pl. 15, fig. 1, 3-5.

Cybele revaliensis sp. nov.; *C. rex* Nieszk; *C. grewingki* sp. nov.; *C. coronata* sp. nov.; *C. wörthi* Eichwald; *C. affinis* sp. nov.; *C. kutorgae* sp. nov.; *C. brevicauda* Angelin.

Clarke, J. M. Geology of Minnesota, Final Report, Vol. 3, 1884.

Description and text figures of the new species *Cybele winchelli* from the Galena limestone. Slocum refers this to his genus *Cybeloides.*

La Touche, J. D. Handbook of the Geology of Shropshire, 1884, p. 40, p.l 3, fig. 60.

Cybele verrucosa figured entire. Llandeilo to Caradoc.

Wigan, Georg. Ueber die Trilobiten der Silurischen Geschiebe in Mecklenberg, 1888, p. 28.

Cybele bellatula Dalman; *C.* cf. *coronata* Schmidt; *C. grewingki* Schmidt; *C. wörthi* Eichwald.

Reed, F. R. Cowper. Geol. Mag., Decade IV, Vol. 2, 1895, p. 49, pl. 7, fig. 11.

Cybele tramorensis sp. nov., from a spatulate-fronted head from the Bala beds at Waterford, Ireland.

Toernquist, Leon. Undersökningat ofver Siljansonädets Trilobitfauna, 1896.—Sveriges Geol. Undersökning, Ser. C, No. 66.

Describes and figures a new species, *Cybele adornata;* regards the form of glabella the same as in *Cybele wörthi* and *affinis,* but separates the species on account of the width of its cheeks, the course of the facial suture, and the arrangement of the tubercles.

Reed, F. R. Cowper. Quart. Jour. Geol. Soc., Vol. 55, 1899, p. 752.

Describes *Cybele sex-tuberculata* sp. nov.; *C. mchenryi* sp. nov.; from Waterford County, Ireland.

Ruedemann, Rudolf. Trenton Conglomerates of Rysedorph Hill.—Bull, N. Y. State Mus., No. 49, 1901, p. 66.

Decribes a pygidium as *Cybele* sp. Ruedemann remarks that the specimen differs in no essential particular from the pygidia figured by McCoy as *Zethus atractopyge, sexcostatus* and *rugosus,* which are synonyms of *Cybele varrucosa.*

Lamansky, M. Die aeltesten Silurischen Schichten Russlands, Etage B, 1905, p. 69.

Notes *C. bellatula* Dalman, and *C. bellatula genuina* Schmidt.

Raymond, Percy E. Carnegie Mus., Vol. 3, 1905, p. 362.—Trilobites of the Chazy Limestone.

Describes *Glaphurus primus* sp. nov. and *Cybele valcourensis* sp. nov. In the same volume, p. 601, he refers both species to *Cybele prima.*. Slocum referred the species to *Cybeloides.*

Narraway, J. E. & Raymond, Percy E. Carnegie Mus., Vol. 3, 1906, p. 598.

Cybele ella sp. nov., an imperfect specimen from Black River limestone, Ottawa, Canada. Slocum referred it to his genus *Cybeloides.*

Reed, F. R. Cowper. The Lower Palaeozoic Trilobites of the Girvan District, Ayrshire.—Palaeont. Society, 1906, Part 3.

Describes and illustrates six species, *Cybele bellatula* Dalman; *C. lovéni girvanensis* var. nov.; *Cybele* cf. *aspera* Linrs. (referred to *Cybele michelli* sp. nov. in the supplement to this publication); *C. verrucosa* Dalman?; also two unidentified species, a & b, pl. 17, fig. 5 & 6.

Olin, E. Om de Chasmopskalk och Trinucleusskiffern Motsvarande Bildningarne i Skäne, 1906.

Referred to one species, *Cybele* cf. *grewingki* Schmidt.

Schmidt, F. Rev. 6, Ostbaltischen Silurischen Trilobiten, 1907, p. 17.

Cyeble bellatula Dalman; *C. panderi* sp. nov.; *C. revaliensis* Schm.; *C. rex* Nieszk; *C. grewingki* Schmidt; *C. wörthi* Eichwald; *C. affinis* Schmidt; *C. kutorgae* Schmidt; *C. brevicauda* Angelin?

Guerich, Georg. Leitfossilien Kambrium und Silur, Vol. 1, 1908, p. 73, pl. 29, fig. 6.

Cybele bellatula after Schmidt's plates 13 & 15.

Slocum, Arthur Ware. New Trilobites from the Maquoketa Beds of Fayette County, Iowa.—Field Mus. Nat. Hist., Geol. Series, Vol. 4, No. 3, 1913. Republished, Geol. Sur. Iowa, Vol. 25, 1914.

Describes and figures a new genus, *Cybeloides,* with *C. iowensis* sp. nov. for genotype.

Refers five American species to this new genus, viz.:

Cybele ella N. & R.; *Glaphurus primus* Raymond (*Cybele valcourensis* Raym.); *C. winchelli* Clarke; *Cybele sp.* Rüdemann; *C. iowaensis* sp. nov.

REED, F. R. COWPER. The Lower Palaeozoic Trilobites of Girvan, Supplement, 1914.

Under *Cybele* the author describes and figures *C. lovéni girvanensis* Reed; *C. bellatula balclatchiensis* var. nov.; *C. michelli* sp. nov. (for *Cybele* sp. b, Reed, Tril. Girvan Dist., p. 130); *C.* cf. *aspera* (Linrs.), Reed, p. 128, of part 3.

RAYMOND, PERCY E. A Contribution to the Description of the Fauna of the Trenton Group.—Geol. Sur. Canada, Mus. Bull. No. 31, 1921.

Cybele spicata sp. nov., from a cranidium.

GENERAL CHARACTERIZATION OF GENERA AND SPECIES.

Order *Proparia* Beecher.

Family Encrinuridae.

Genus *Cybele* Lovén, 1845.

Type *Cybele bellatula* Dalman.

In general the head of forms belonging to this genus is semilunar in outline, and distinguished by its highly elevated frontal margin, as in *Cybele bellatula.*

Glabella rather flat and rectangular when the sides are parallel, but pear-shaped and convex when enlarged towards the front.

Lateral furrows of the glabella distinct, extending to the dorsal grooves and outlining the side lobes when the glabella is flat, or consisting of more or less deep pits or impressions.

Dorsal grooves shallow in those species in which the glabella is enlarged towards the front, but in *Cybele wörthi,* etc., they continue until they disappear among the larger tubercles, to such an extent as to give such species the appearance of *Encrinurus.*

Occipital ring widest in the middle and strongly outlined by deep furrows.

Eye lobes well advanced on the frontal margin in *Cybele bellatula* and *C. coronata;* opposite the center of the cheeks in *C. wörthi, C. brevicauda, C. grewingki, C. lovéni, C. aspera, C. adornata, C. winchelli,* and *C. prima;* far to the rear in *C. affinis, C. revaliensis,* and *C. kutorgae;* opposite the first furrow of the glabella in *Cybele rex, C. tramorensis, C. mchenryi,* and *C. verrucosa.*

The following species have ocular ridges: *Cybele coronata, C. grewingki, C. tramorensis* and *C. mchenryi.*

Ocular ridges extending from the bottom of the frontal lobe of the glabella, in front of the first lateral furrow, to the eyes in most cases: *C. coronata, C. mchenryi, C. sextuberculata, C. tramorensis.*

In *Cybele tramorensis* there rises a low, well marked ridge, slightly in front of the anterior, outer angle of the frontal lobe of the glabella, which runs forward and slightly outward to become a prominent, rounded tubercle, which projects beyond the margin. This marginal tubercle corresponds to the side tubercle of Schmidt's classification, and is present in most of the species of *Cybele,* but wanting in *C. coronata.*

Close beneath the posterior outer slope of the ridge leading up to the side tubercle is a deep, circular pit, the terminal pit of Schmidt's classifi-

cation. It lies at the anterior end of the axial furrow and is very conspicuous in *C. tramorensis.*

In *Cybele bellatula* the facial suture cuts the posterior margin inside of the genal angle, running thence in a slightly curved line to the eyes and over them at an acute angle to the anterior margin, thence at right angles on both sides of the central tubercle or spine to the rostral shield. This course is typical of the genera *Encrinurus* and *Cromus.*

The hypostoma is oval, with a serrated posterior margin, (see Volborth's fig. 6, pl. 1, of *Cybele bellatula.*) The figure given by Schmidt, pl. 13, fig. 9, of this species represents the anterior wings as larger and obtusely excavated below, while the bordering rim is not very distinct. There are two pairs of oblique, lengthened grooves, one above the other, not continuing to form a coherent groove across the median field of the hypostoma, which is level between them, and without maculae. Nearer the anterior border and close below the wings there is a small, suborbicular dark spot. The surface of the hypostoma is granulated.

The fixed cheeks are usually twice as long as the glabella, with rounded genal angles, (*C. wörthi, C. brevicauda,* etc.) or ending in short spines, (*C. bellatula, C. rex, C. coronata, C. winchelli,* etc.). The free cheeks from quadrants of a circle, with unequal angles and hook shaped projections.

The thorax consists of twelve segments (thirteen in *C. michelli*); pleurae arched, gradually decreasing in breadth, forming bourrelets, but exhibiting on their front edge, up to the knee, a furrow which articulates through the fulcral portion with the peura touching it directly in front; pleurae of the first five body segments ending bluntly, the other seven ending in spines, the sixth segment being the longest and most noticeable on account of the sword-like form which has given its name to *C. bellatula.*

The fifth segment of *C. grewingki* and *C. revaliensis* has similar characteristics.

The pygidium is generally triangular in form, having a conical, jointed axis, with sixteen to eighteen axial joints, with only the first four or five entire and bearing pleurae. *Cybele michelli* has four anterior rings with ten to twelve incomplete ones. The pleurae conform to those of the thorax, five in *C. bellatula,* four or five in *C. rugosa* and *C. winchelli,* while all the other species have four pleurae.

The ornamentation is generally a single row of tubercles on the center of the pleurae, with a double row of lateral tubercles on the axis.

Geological range:

Ordovician.

Geographical range:

Northern Europe:—Sweden, Norway and Russia.

British Isles:—Scotland, Ireland, North Wales.

North America:—Canada, New York, Minnesota and Iowa.

DISTRIBUTION AND CLASSIFICATION OF SPECIES

The genus *Cybele* Lovén is confined to the Ordovician, and has had about thirty-nine species and varieties referred to it, of which five are now referred to other genera and six to the new genus, *Cybeloides,* leaving only twenty-eight species and varieties in the genus. Of these thirty-nine species and varieties, only thirteen are known from whole specimens, viz:

Cybele kutorgae; C. bellatula; C. verrucosa; C. wörthi; C. grewingki; C. lovéni; C. ovata; C. lovéni girvanensis; C. michelli; C. adornata (pygidium unknown).

Cybeloides winchelli; C. iowensis; C. ella.

There are sixteen Northern European species and varieties, viz:

Cybele bellatula Dalm., Om Palaed., 1826, p. 228, B, 2b, B. 3a, Llandeilo.

" *verrucosa* Dalm., Om Palaed., 1826, p. 134, Bala, Lower Llandeilo.

" *dentata* Esmarck, Mag. Naturv., Vol. 1, p. 269, pl. 7, fig. 10, Reg. D-E.

" *brevicauda* Ang., Pal. Scand., 1854, p. 86, pl. 41, fig. 14, E. F. 1, Upper Ordovician.

" *aspera* Linrs., Sv. Vet. Akad. Handl., Vol. 6, No. 2, p. 62, pl. 1, fig. 11-13, Beyrichian Kalk, Middle Ordovician.

" *lovéni* Linrs., Sv. Vet. Akad. Handl., Vol. 8, 1869, p. 63, pl. 1, fig. 14, Chamopskalk, Middle Ordovician.

" *adornata* Törnquist, Sv. Geol. Under. ser. C. No. 66, p. 25, pl. 1, fig. 20, 21, Chamopskalk, Middle Ordovician.

" *bellatula wöhrmanni* Schmidt, Rev. 6, Ostb. Sil. Tril., 1907, p. 101, text fig. B. 3b.

" *wörthi* Eichwald, Sil. Syst. Estl., 1840, p. 70, C. 1a, C. 1b. Middle Ordovician.

Zethus rex Nieszkowski, Monog. Baltic Tril., p. 614, pl. 1, fig. 3, C. 2, C. 3.

Cybele affinis Schmidt, Rev. 1, Ostb. Sil. Tril., 1881, p. 216, pl. 13, fig. 18, 19, C. 1a.

" *revaliensis* Schmidt, Rev. 1, Ostb. Sil. Tril., 1881, p. 207, pl. 13, Fg. 20; pl. 14, fig. 6; pl. 16, fig. 6, 7; pl. 16, fig. 40, C. 1b.

" *grewingki* Schmidt, Rev. 1. Ostb. Sil. Tril., 1881, p. 211, pl. 14, fig. 1, 2, C. D. 2.

" *coronata* Schmidt, Rev. 1, Ostb. Sil. Tril., 1881, p. 213, pl. 13, fig. 24-27; pl. 14, fig. 5; pl. 15, fig. 10, C. 2.

" *kutorgae* Schmidt, Rev. 1, Ostb. Sil. Tril., 1881, p. 217, pl. 15, fig. 11-14; pl. 16, fig. 39a, b, fig. 12; text fig. C. 3. D1. D2.

" *panderi* Schmidt, Rev. 6, Ostb. Sil. Tril., 1907, p. 19, B. 3a, B. 3b, C. 1a.

The British Isles have thirteen species and varieties, viz:

Cybele arenosa McCoy, Sil. Foss. Ireland, 1846, p. 40, pl. 4, fig. 12, Bala.

" *verrucosa* Dalman, Bala & Lower Llandovery.
" *rugosa* (Portlock), Geol. Londonderry, p. 302, pl. 5, fig. 1 (as Ogygia), Lower Llandovery.
" *lovéni girvanensis* Reed, Tril. Girvan, p. 126, pl. 17, fig. 1-4, Upper Bala.
" *bellatula* Dalman, Llandeilo.
" *mchenryi* Reed, Quart. Jour. Geol. Soc., Vol. 55, p. 757, pl. 49, fig. 7, Bala. This may be the cephalon of *C. rugosa*.
" *sextuberculata* Reed, Quart. Jour. Geol. Soc., Vol. 55, p. 752, pl. 49, fig. 8, Bala.

Zethus atractopyge McCoy, Referred to *Cybele verrucosa*.

Cybele tramorensis Reed, Geol. Mag. Decade 4, Vol. 2, p. 48, pl. 7, fig. 1, Bala.
" *bellatula balclatchiensis* Reed, Suppl. Tril. Girvan, 1914, p. 41, pl. 7, fig. 7, Llandeilo.
" *michelli* Reed, Suppl. Tril. Girvan, 1914, p. 42, pl. 7, fig. 7, Upper Ordovician.
" *connemarica* Reed, Quart. Jour. Geol. Soc., Val. 65, 1909, p. 146, pl. 6, fig. 6, 7, Lower Ordovician.
" *ovata* Etheridge, Mem. Geol. Sur. Lake Dist., 1876, p. 112, Skiddaw Slates, Lower Ordovician.

North America and Canada have seven species, viz:

Cybele ella Narraway & Raymond, Ann. Carnegie Mus., Vol. 3, 1906, p. 596, Black River, Lower Ordovician.

Cybeloides iowensis Slocum, Field Mus., Geol. Ser., Vol. 4, No. 3, 1913, p. 63, pl. 16, fig. 1-4.

Cybele mira Billings, Pal. Foss. Canada, Vol. 1, 1865, p. 292, fig. 282 (pygdium only), Trenton.
" *spicata* Raymond, Geol. Sur. Canada, Mus. Bull. No. 31, 1921, p. 34, pl. 11, fig. 1, Cottingwood Limestone, Middle Ordovician.
" *prima* Raymond, Ann. Carnegie Mus., Vol. 2, p. 562, pl. 14, fig. 7, 8, Chazy Group.
" *winchelli* Clarke, Geol. Minnesota, Vol. 3, 1888, p. 742, text fig., Galena Limestone.
" *sp.* Ruedemann, Bull. N. Y. State Mus., No. 49, 1901, p. 66, Trenton.

Slocum referred all these species to his new genus *Cybeloides*.

The following six species are known only from fragments of the head: *Cybele affinis; C. coronata; C. mchenryi; C. sextuberculata; C. arenosa; C. tramorensis.*

The following nine species and varieties are known from the head and tail only: *Cybele brevicauda; C. rex; C. revaliensis; C. kutorgae; C. rugosa; C. aspera; C. bellatula balclatchiensis; C. lovéni girvanensis; C. prima.*

The following three species are known from the pygidia only: *C. mira; C. dentata; C. connemarica.*

Species with five pairs of pleurae in the pygidia:—*Cybele bellatula; C. rugosa; C. winchelli.*

Species with four pairs of pleurae in the pygidia:—*Cybele wörthi; C. verrucosa,* etc.

The following species are of the type of *Cybele bellatula* with three or more spines on the anterior margin of the cephalon:—*Cybele bellatula; C. rex; C. aspera; C. coronata; C. tramorensis; C. prima; C. sextuberculata; C. winchelli; C. panderi; C. bellatula balclatchiensis; C. michelli C. spicata.*

The following species are of the type of *C. verrucosa* Dalman, with the anterior margin of the head ornamented with one or more rows of tubercles:—*Cybele verrucosa; C. wörthi; C. adornata; C. affinis; C. prima; C. ella; C. brevicauda; C. revaliensis; C. kutorgae; C. dentata* (Boeck); *C. mcheuryi; C. lovéni; C. lovéni girvanensis.*

In the folowing species the pleurae of the sixth or seventh segment is prolonged into a spine; generally the four anterior segments end bluntly and the posterior eight in long spines. The specific name *Bellatula* comes from its sword-like pleural extension. As far as known, the species with this characteristic are:—*Cybele adornata; C. bellatula; C. brevicauda; C. lovéni; C. lovéni balclatchiensis; C. lovéni girvanensis; C. ella; C. wörthi; Cybeloides iowensis.*

Dr. Schmidt adopted the following classification:

Group 1. With five pleurae in the pygidium and only one tubercle on the frontal ridge in front of the glabella:—*Cybele bellatula.*

Group 2. With four pleurae in the pygidium and a greater number of spines and tubercles on the frontal ridge in front of the glabella; glabella markedly broadened towards the front, with scattered tubercles:—*Cybele wörthi; C. affinis; C. kutorgae; C. brevicauda.*

Group 3. Glabella not widened in front, with three or four spines or tubercles in front of the glabella:—*Cybele revaliensis; C. rex; C. grewingki; C. coronata; C. aspera; C. verrucosa; C. dentata; C. lovéni.*

A classification based on the thoracic segments:

Group 1. Of the type of *Cybele verrucosa.*

Thorax with twelve segments of equal length; galabella wide in front, narrowing towards the base; pygidium rectangular; axis of twenty joints; pleurae on the first four axial rings only.

Group 2. Of the type of *Cybele bellatula.*

Thorax of twelve segments, the pleurae distinguishing this group from all others; first four or five pleurae twice as wide as the others and ending bluntly, the other eight or seven gently bent to the rear and terminating in long, pointed spines; glabella with three pairs of side furrows, nearly cylindrical from the base to the first furrow, and clavate from this point; pygidial axis with fifteen to eighteen joints, only the first five or six entire, the rest being notches at the sides; lateral lobes with five pairs of pleurae.

Group 3. Glabellar furrows represented by pits.

Most of the Russian species of *Cybele* have sharply impressed glabellar furrows with the exception of *C. grewingki, C. kutorgae* and *C.*

revaliensis, but this characteristic is well represented in the American species and is considered of generic value for the genus *Cybeloides* by Field.

DIAGNOSES OF SPECIES.

Cybele adornata Törnquist.

Sveriges Geol. Undersökning, Ser. C, No. 57, 1883, p. 25, pl. 1, fig. 20, 21.

Head semilunar, more than twice as broad as long, with rounded genal angles; glabella, at the neck furrow, occuying 1/5 to 1/6 of the width of the head, having the lobed part nearly parallel-sided, then suddenly widening to form the front lobe; the three glamellar furrows short, of equal length, and directed a little backward; side lobes of equal size and almost of equal form, the unlobed median portion between them occupying more than half the breadth of the glabella; axial grooves deep, at some distance from the anterior margin of the head, forming almost right angles with the glabellar front border furrow, which is not evenly bent, but forms a broken line composed of three straight parts, thus giving a hexagonal shape to the front lobe of the glabella; head border having a distinct marginal furrow which, above the eyes, bends itself from the border backward and inward to join the angles between the axial furrow and the front border of the glabella; raised seam beyond the border furrow quite broad, particularly where the faint sutures reach the corner of the head; cheeks, thus bordered by the axial furrows and the marginal furrows, exhibiting almost the form of fish bladders; cheeks sloping steeply inward towards the axial grooves, but slowly outward; eyes located near the glabella, somewhat nearer the occipital than the frontal furrow; surface of the glabella covered with large and small tubercles, with probably five pointed knobs located in front of it near the head furrow, which are distinguished from the other tubercles of the head by their height compared with their circumference, and by having their tops perforated; other groups of nodes on the thickened margin outside the facial sutures becoming smaller and disappearing towards the genal angles.

Thoracic axis very convex, (in my specimen somewhat compressed laterally, so that the proportion of its width to that of the pleurae cannot be given); pleurae directed straight outward near the axis, while their ends are bent backward; pleurae of the sixth segment distinguished from the others by their greater length and their continuous breadth, the amount by which these pleurae exceed the others in length not having been noted; entire thorax exhibiting a shagreen, granulated surface without tubercles.

Pygidium unknown.

Length of head 14, width 34, greatest width of glabella 10, least width 6 m m.

Sweden, Kärgade Fauna, Chamopskalk. (Middle Ordovician).

This species approaches *C. wörthi* and *C. affinis* in the form of the glabella, but it is distinguished from both by the width of the cheeks, the course of the facial suture, and the arrangement of the tubercles. Behind the eyes the facial sutures run straight to the outer margin of the head, and parallel to the posterior margin; in front of the eyes they diverge very little

until they reach the intramarginal furrow, then they again converge so as to cut the anterior border on either side of the row of great tubercules in front of the glabella.

Cybele affinis Schmidt.

Mem. Acad. Imp. Sci., Ser. 7, Vol. 30, p. 216, pl. 13, fig. 18, 19.

This species is similar to *C. wörthi* Eichwald, but the eyes are further back, opposite the second lateral furrow of the glabella. The furrow of the limb appears in front of the ridge of the limb on the upper side, so that it is visible from above and not from below, as in other species of *Cybele*.

From Pawlowsk, probably belonging to the Echinosphaerite Chalk. B/3b. (Middle Ordovician.)

Cybele arenosa (McCoy, 1846). . .

Calymene arenosa McCoy.

Synopsis Sil. Foss. Ireland, 1846, p. 47, pl. 4, fig. 12, cranidium.

Cybele arenosa Bigsby, Thesaurus Siluricus, 1868, p. 47.

Glabella with three pairs of lateral lobes, elongate, oval, convex, the base much contracted and rounded, the dorsal furrows deep, tuberculated; cheeks very wide, gently convex, triangular, each cheek exceeding the length of the glabella by about one-half its width; eyes at the height of the upper cephalon tubercle, rather less than their own diameter from the glabella; entire surface of the cranidium ornamented as if sanded, very minutely granulated, with larger, sharp, scattered tubercles of extremely irregular size and distribution.

Cranidia small, length 4, (reaching 10), width 16 mm.

Ballygarvan Bridge, New Ross, County Wexford; abundant in Slates of Greenvile, Enniscorthy; Ireland. Ordovician Bala (Upper Ordovician).

Cybele aspera Linnarsson.

Sv. Vetensk. Akad. Handlingar, Vol 8, No. 2, p. 62, pl. 1, fig. 11-13, 1869.

Described from the head and tail.

Cf. *Cybele aspera* (Linnarsson) Reed, Tril. Girvan Dist., 1903, p. 128, pl. 16, fig. 12, 13.

Breadth of head 2½ times greatest length; surface with numerous tubercles; glabella elevated, clavate; frontal lobe almost semicircular; side lobes small, sloping, separated by deep, oblong pits; tubercles covering the glabella varying in size, the largest arranged in two parallel rows near its middle; glabella bordered at the front by broad, shallow grooves, armed with a row of five spines with a lateral tubercle on each side; dorsal grooves broad, diverging, slightly bent, with the convex side inward, having a deep, rounded pit on each side at their anterior part; occipital groove shallow, near the dorsal grooves, having a deep depression on each side.

Cheeks convex, armed posteriorly with a row of spines or teeth, inwardly bordered by a deep and broad furrow; genal angles rounded off; eyes located nearly opposite the frontal lobe of the glabella, the stalks only

visible in the smaller specimens; free cheeks having a broad border ornamented with tubercles.

Thorax imperfectly known, the segments not ornamented by rows of tubercles, the eighth pleura enlarged at the fulcrum point.

Pygidium rectangular; axis with eighteen axial joints with four rows of nodes, the first seven joints only extending entirely across, the others notched at the sides; pleurae four, running almost parallel with the axis; ends free.

Beyrichiakalk, Mosseberg, Ponstorp, Sweden.

Reed, (Trilobites of the Girvan District) remarks that the glabella has three pairs of deep lateral pits which are not contained into the dorsal furrows, and these incompletely mark off three pairs of lobes as in *C. aspera*, whereas, in *C. verrucosa* there are true furrows.

Balclatchie Group, (Llandeilo) Ardmillan, Dow Hill, (Middle Ordovician).

Reed finally referred the English species from the Girvan District to *Cybele michelli* sp. nov. in his Supplement to the Trilobites of the Girvan District.

Cybele bellatula (Dalman, 1826).

Calymene? bellatula Dalman, 1826, Svensk. Vet. Akad. Handl., p. 228, pl. 1, fig. 4a-d.

" " Dalman, Om Palaead., p. 328, pl. 1, fig. 4a-d. 1828.

Zethus verrucosus Pander, 1930, Beiträge Geol. Russ., p. 140, pl. 5, fig. 6; pl. 40, fig. 4, equals *Cybele panderi* Schmidt.

Calymene bellatula Hisinger, 1837, Leth. Cuec., p. 11, pl. 1, fig. 5a, b.

Cryptonymus parallelus Eichwald, 1840, Sil. Schicht. Syst. Estl. p. 93.

Cybele bellatula Lovén, 1845, Ofvers. k. Sv. Vet. Akad. Forhandl., p. 111, pl. 2, fig. 3.

" " Corda, 1847, Prodrom., p. 90, pl. 5, fig. 33.

Zethus verrucosus Volborth, 1848, Verhandl. Russ. Min. Ges., 1847, p. 8, pl. 1, fig. 5-7.

" *bellatula* Barrande, 1852, Syst. Sil. Bohem., Vol 1.

Cryptonymus bellatula Angelin, 1852, Palaeont. Scand., p. 3, pl. 4, fig. 1-3; also p. 89.

Zethus verrucosus Hoffmann, 1858, Verhandl. Russ. Min. Ges., p. 32, pl. 3, fig. 4.

Cryptonymus bellatula Eichwald, 1860, Leth. Ross., p. 1414.

" *parallelus* Eichwald, 1860, Leth. Ross., p. 1417.

Cybele dentata Kjerulf, 1865, Veiviser, etc., p. 6, (not *Tril. dentatus* Esmarck.)

Cryptonymus (Cybele) bellatula Vogdes, 1878, Monog. Genera *Zethus*, etc., p. 31, pl. 2, fig. 1, (copy of Angelin's figure.)

Cybele bellatula Schmidt, Rev. Ostb. Sil. Tril., pt. 1, p. 203, pl. 13, fig. 9-13; pl. 15, fig. 1-5.

Cybele bellatula Brögger, 1882, Die Sil., Etag. 2 and 3, p. 136, pl. 6, fig. 2a, b.

" " Roemer, 1885, Lethaea Erratica, p. 52, pl. 3, fig. 9.

" " Wigan, 1888, Zeitschr. Deutsch. Geol. Ges., p. 88, pl. 10, fig. 15.

" " Lindström, 1901, K. Svensk. Vet. Akad. Handl., No. 34, p. 52, pl. 4, fig. 2.

" " Reed, 1906, Tril. Girvan Dist., p. 123, pl. 16, fig. 14-17.

" " *wöhrmanni* Schmidt, 1907, Rev. 6, Ostb. Sil. Tril., p. 101, text fig. 11, 11a.

" " Gürich, 1908, Leitfossilien Kambrium und Silur, p. 73, pl. 27, fig. 5, 5a.

" " *balclatchiensis* Reed, 1914, Lower Pal. Tril. Girvn, Suppl., p. 41, pl. 7, fig. 6.

Head semilunar, twice as wide as long, with obtuse genal angles and a wide, thick marginal border ornamented with large tubercles; frontal margin armed with three short spines.

Glabella with three side furrows, nearly cylindrical from its base to the first furrow, and from this point the clavate surface covered with large tubercles; cheeks convex, separated from the glabella by deep and wide dorsal grooves; free cheeks bent gently downward; facial suture commencing on the outer margin of the head above the genal angles, running over the eyes, which are located well to the front on elevated pedicles, and there converging at the front of the glabella to the outer margin at a right angle to the rostral shield; occipital ring very convex, marked in the center by a tubercle (Volborth's figure shows a row of tubercles).

Thorax with twelve segments (plèvre á bourrelet); pleurae distinguishing this genus from all others, the first five being twice the width of the other seven, and gently bending to the rear, terminating in rounded ends; the sixth pleura wide, bending to the rear until it reaches the fulcrum point, then enlarging and bending suddenly at a right angle to the rear and running parallel with the axis, until it ends in a long, pointed spine; the other pleurae conforming to this one and gradually diminishing in size.

Pygidium with five pleurae; axis ending in a point and having fifteen to eighteen axial joints, the first five or six entire, the others notched at their sides; first four pleurae running almost parallel to the axis, the last pair united at their extremities, and joined beyond the termination of the axis; pleurae ornamented by a central row of tubercles; hypostoma oval, with two side wings; anterior wings large and obtusely excavated below, the border rim not distinct; two pairs of oblique, lengthened grooves in the center, one above the other; surface granulated; a small, rounded, dark spot near the anterior border, close below the wings.

Ostergotland, Husbyfjol, Sweden; Wesenburg, Russia. B/2a, B/3a. (Middle Ordovician).

The species is rare in Sweden but common in Russia.

Cybele bellatula wöhrmanni var. nov.

Schmidt, Rev. 6, Ostb. Sil. Tril., 1907, p. 101, fig. 11, 11a, Abänderung bei Archangelskje am Wolchow, B/2b. (Middle Ordovician).

Cybele brevicauda Angelin, 1854, Palaeont. Scand., p. 89, pl. 41, fig. 14.

Zethus brevicauda Nieszkowski, Monog. Trilobit., p. 617.

Zethus bellatula Nieszkowski, Monog. Trilob., p. 613, (ex parte).

Zethus atractopyge Nieszkowski, Mong. Trilob., p. 616.

Encrinurus sexcostatus Nieszkowski, Monog. Trilob., p. 610, (not Salter).

Cybele brevicauda Schmidt, 1881, Mem. Acad. Imp., Ser 7, Vol. 30, p. 219, pl. 11, fig. 23; pl. 14, fig. 7-10; pl. 15, fig. 15-17.

Cryptonymus (Cybele) brevicauda Vogdes, 1878, Monog. of Genera *Zethus, Cybele,* p. 33.

Head semilunar, strongly convex, twice as broad as long, with deep dorsal grooves; glabela pear shaped, longer than wide; frontal lobe strongly arched, occupying more than one-half the entire length of the glabella; surface of the glabella covered closely with large and small tubercles, six or seven of which, at its anterior margin, form a circle which is separated from the rest of the glabella by a faint furrow; a larger tubercle on each side of this circle, and not separated from it by any space, which corresponds to the side tubercle in other species; lateral glabellar furrows indistinctly indicated and disappearing among the larger tubercles; neck ring well developed and raised over the back of the glabella.

First five segments of the thorax ending in blunt points, the sixth with a long extension bending to the rear.

Pygidium broadly oval, as long as broad, the axis, with sixteen joints, ending in a triangular point which is enclosed by the inner pleural ends; pleaurae four, ending in short, blunt ends; the axis with some small tubercles in pairs in the obliterated central portion.

Description drawn from heads and pygidia from Neuenhof, near Hapsal, Russia. The original description of the species was made by Angelin from a pygidium from Reg. D-E, Dalecarlia, in which he represents a tail with sixteen axial joints, the first three extending across it, and four pairs of pleurae of equal length.

Nieszkowski remarks (p. 617, Mong. of Trilob.) that, in the Silurian of Scandinavia and in Esthonia, only the tails of this species have been found; that only the first four axial joints are entire, these having long pleurae bending backward as in the other species of the genus *Zethus;* that the other joints are narrow rings and grow together, forming an obtuse conical end; that on the axis there are two rows of very faintly defined tubercles, with no tubercles on the pleurae.

Schmidt classes this species in his second group, which has four pleurae in the tail, with five spines at the frontal margin of the head, in front of the glabella.

Sweden, Esthonia, E. F/1, Bala; Upper Ordovician.

Cybele connemarica Reed, 1909.

Quart. Jour. Geol. Soc., Vol. 65, 1909, p. 146, pl. 6, fig. 6, 7.

Pygidium subpentagonal, as wide as long, gently convex; lateral lobe bent down slightly in front and steeply behind; axis conical, tapering rather rapidly at about thirty degrees, obtusely pointed, annulated throughout, more than a third of the width of the pygidium at the anterior end and extending three-fourths of its length, composed of twelve or thirteen complete rings separated by strong, equal furrows, with traces of lateral nodules on the rings; dorsal furrows well marked; a narrow, elongate, post-axial piece extending from the tip of the axis to the posterior margin of the pygidium.

Lateral lobes with nine or ten pairs of pleurae, of which the first three are subequal in size and the rest successively decreasing in size and strength, the ninth being very slender and short and lying close against the last three or four rings of the axis, but not extending behind its tip; faint traces of a smaller, linear tenth rib are occasionally visible.

The first pleurae bending back strongly at about a third of their length, thus arching backward almost parallel to the axis and reaching as far as the tip; the following pleurae less strongly curved and becoming successively straighter and subparallel to the axis, finally curving slightly inward posteriorly; the last five pairs of pleurae ending in free, obtuse, short points on the margin and separated by strong interpleural furrows, finally curving inward to meet in the middle line behind the post-axial piece; the other four or five pleurae enclosed and not reaching the margin, but ending weakly against the sides of the post-axial piece; a narrow, anterior band occasionally visible on the anterior edge of the first three pleurae, but usually they appear to be simple and unfurrowed.

Surface of pygidium granulated, with a few irregularly disposed tubercles on the pleurae; length 8 mm., width 8 mm.

Tourmakeady District, Gortbunacullin, &c., Arenig. (Lower Ordovician).

The species seems to be allied to *Cybele bellatula*, but the complete condition of the axis rings and their much smaller number, as well as the different characters of the pleurae of the axial lobes, mark it off.

Cybele coronata Schmidt, 1881.

Rev. Ostb. Sil. Tril., Phacopiden, Cheiruriden, und Encrinuriden, 1881, p. 213, pl. 13, fig. 24, 27; pl. 14, fig. 5; pl. 15, fig. 10.

Cybele coronata Wigan, 1888, Zeitschr. d. Duetsch. Geol. Ges., 1888, p. 89, pl. 10, fig. 16.

Dorsal grooves very flat, glabella drawn forward in a decided arch, so that the length of the frontal lobe takes up more than half the length of the whole glabella; side furrows of the glabella strongly indented, but not extended to the dorsal grooves; five long spines in front of the glabella extending for ten millimeters and forming a crown which occupies the whole frontal margin; the isolated side tubercles, prominent in other species, wholly wanting, but the groove usually lying behind them, at the end of the dorsal groove, is present, but rather shallow, and lying at a lower

level than the rest of the furrow; ocular ridge strongly developed, jutting out horizontally and running parallel with the posterior margin on both sides, with a number of depressed points alongside the bottom of the ridge; eyes located the width of the glabella from the dorsal groove and on a level with the first lateral gabellar furrow; cheeks similar to those of *Cybele rex*, less than twice as wide as the glabella, and but slightly raised towards the eyes; descending sharply towards the outer edge; surface of the cheeks with scattered tubercles, and covered with finely indented impressions, but still without the rough surface of *Cybele rex;* free cheeks with a well developed limb, marked by prominent tubercles, and very closely resembling those of *Cybele rex*.

Pygidium, like that of *C. rex*, broad oval, rather flat, as long as broad, the axis with sixteen or seventeen joints, of which only the anterior four extend across; triangular tip of the axis bent downward and split at the end; ends of the pleurae free, elongated, pointed and somewhat diverging; a few tubercles on the center of the axis and on the pleurae.

Estland, C/2. (Llandeilo) Middle Ordovician.

This species is found, though not entire, together with *Cybele rex,* to which it is related, though with distinct differences.

Cybele dentata (Esmarck, 1833).

Om nogle nye Arter af Tril.—Mag. for Naturvidensk. ander Rakkes, Christiania, Vol. 1, 1833, p. 269, pl. 7, fig. 10, as *Trilobites dentatus.*

The author illustrates a pygidium with seventeen or more entire axial rings and four pairs of pleurae terminating in spines.

Trilobites dentatus Boeck, Uebersicht der bischer in Norwegen gefundenen formen der Trilobiten Familie, 1838, p. 139, No. 8; also *T. plicatus*, p. 140, No. 12.

The author gives a description of the cephalon in which the semicircular glabella, which is rounded in front, has three pairs of lateral furrows, and genal angles terminating in elongated spines.

Cybele dentata Kjerulf, 1865, Veiviser, p. 6.

Brögger, Die Sil. Etage 2 and 3, p. 136, referred this to *Cybele bellatula.*

Cybele dentata Angelin, Palaeont. Scand., 1854, p. 89, pl. 41, fig. 12.

The author's description is very brief.

Pygidium smooth; axis marked with about seventeen rings, obliterated in the middle.

Reg. D-E, Norway, Christiania. (Upper Ordovician.)

The figure shows four pairs of pleurae not extended beyond the tip of the axis; the first four axial rings are entire and bear pleurae, the others being notched at the sides of the axis.

Cryptonymus (Cybele) dentatus Vogdes, 1877, Monog. Genera *Zethus, Cybele,* etc., p. 33.

Trilobites dentatus Burmeister, H. Organ. Tril., English Ed, 1846, p. 119, No. 5.

The author refers to Esmarck's, and also to Boeck's description of this species. He refers *T. dentatus* (Boeck) to *Phacops,* of the division

B/d, and approximates it to *Phacops arachnoides,* remarking: "From these statements there appears now to be scarcely a doubt that it belongs to Dr. Lovén's new genus *Cybele.*"

Cybele ella Narraway & Raymond.

Ann. Carnegie Mus., Vol. 3, p. 598, fig.

Described from an imperfect specimen from Black River Limestone, Ottawa, Canada.

Head short, very wide; glabella narrow, convex; cheeks depressed, convex, lower than the glabella; length of head 4, width 12 mm.; glabella narrow, expanding towards the front, with three furrows represented by three pairs of pits, the second and third pits on each side united into a long depression parallel with the axis; behind the third pair a pair of rather deep pits in line with the neck furrow; leading diagonally forward and outward from the pits are narrow depressions which bound the rear ends of the side lobes of the glabella: surface with five pairs of tubercles; genal angles with short spines.

Thorax with twelve segments, the sixth a little wider and more prominent than the others, (the specimen does not show the ends of the pleurae).

Pygidium very small, about as wide as long; pleurae four pairs of double ribs; axial joints sixteen, notched at the sides and with a double row of tubercles.

Length 14, width 12 mm.

The authors compare the species with *C. prima* from the Chazy.

Cybele sp. Ruedemann, 1901.

Bull. 49, N. Y. State Mus., 1901, p. 66, pl. 4, fig. 12.

Cybele prima (Raymond), as *Glaphurus primus,* Ann. Carnegie Mus., Vol. 2 p. 362, pl. 14, fig. 7, 8.

Cybele valcourensis Raymond, Ann. Carnegie Mus., Vol. 2, p. 362, pl. 14, fig. 9.

Described from the head and detached free cheeks, Chazy, Valcour, N. Y.

Head short, broad, with a wide glabella which is moderately convex; glabellar furrows short and turned backward; second pair running into the third pair and the third pair joining the neck furrow; surface tuberculated; fixed cheeks very convex; free cheeks pitted all over except below, and a little in front of the eyes, where there is a group of small tubercles.

Pygidium described as *C. valcourensis,* from five miles south of Plattsburgh, N. Y.

Pygidium narrow, tapering to a point; axis narrow, but not extended to the posterior end, with the first joint entire and fourteen to eighteen joints notched at the sides; pleurae five pairs of double ribs which turn back nearly parallel with the axis, each rib consisting of a smaller anterior, and a larger posterior portion, and ending in short, rounded spines, which extend a short distance behind the border; axis with five pairs of nodes.

Canada, Black River Group, Ontario near Ottawa. Lower Ordovician.

An imperfect tail was described by Ruedemann, Bull. N. Y. State Mus., No. 49, p. 66, pl. 4, fig. 12, from a pebble of Rysedorph Hill, which seems to belong to this species.

In this species all the pits of the glabella are connected, but in *Cybele ella* only the second and third pits are connected, though it is probable that both belong to the same species.

Slocum refers these species to Cybeloides.

Cybele grewingki Schmidt, 1881.

Rev. Ostb. Sil. Tril., Phacopiden, Cheiruriden & Encrinuriden, 1881, p. 211, pl. 14, fig. 1, 2; fig. 11, in text.

Cybele grewingki Wigan, 1888, Zeitschr. d. Deutsch. Geol. Ges., 1888, p. 89, pl. 10, fig. 17.

Cybele grewingki Olin, Om de Chasmopskalken & Trinucleusskiffern, p. 49, 1906.

Cybele grewingki is much larger than *C. rex*, the glabella is the same in outline, but more convex, and it has five blunt tubercles in front of the glabella, whereas *C. rex* usually exhibits spines. The cheeks are similar to those of *C. rex*, but the eyes are moved back to a level with the second glabellar furrow. In the thorax the fifth segment is strongly developed instead of the sixth as is usual in the genus *Cybele*.

The pygidium is more elongated than in *C. rex*. It is pear-shaped, much contracted at the end, about one and one-sixth times as long as broad. The axis has eighteen joints, the front four being entire, the rest notched at the sides. The pointed triangular end of the axis is pushed between the inner pleural ends which barely touch one another.

The four pleurae terminate in blunt pointed ends, are flatly arched and show indistinct rows of tubercles on the surface as in *C. revaliensis*.

Length of the head 27, breadth 70 mm.; length of pygidium 24, breadth 20 mm.

St. Mathias.

Russian species, C/2, D/1, D/2. St. Petersburg & Estland. (Middle Ordovician, Llandeilo, Utica.)

Cybele kutorgae Schmidt, 1881.

Mem. Acad. Imp. Sci., Ser. 7, Vol. 30, p. 217, pl. 15, fig.11-14; pl. 16, fig. 39a, b.

Cybele kutorgae Wigan, 1888, Zeitschr. d. Deutsch. Geol. Ges., 1888, p. 89, pl. 10, fig. 17.

Cybele kutorgae Olin, 1906, Lunds Geol. Haltulb. Ser. B, No. 4, p. 49.

Head broad and short, rounded broadly in front, about 2½ times as broad as long; dorsal grooves deep, plainly separate in front, and showing the end grooves distinctly; glabella trapezoidal, arched slightly, convex in front; frontal lobe less than half as long as whole glabella, its front breadth being from one and a quarter to one and a fifth that of the base of the glabella.

The first four segments of the thorax with rounded terminations to the pleurae, the sixth pleurae terminating in extended spines, the other pleurae diminishing in size so that the width of the axis of the twelfth segment is less than half that of the first segment.

Pygidium broadly uniform, blunt, approaching that of *C. wörthi;* axis with sixteen joints, of which only the first four extend across it, and with four tubercles in pairs in the central portion; termination of the axis a short, triangular point, which is overtopped by the pleural ends of the fourth pair.

Reval, Mölokowizy, etc., Russia. C/2, D/1, D/2. (Llandeilo). (Middle Ordovician.)

The species is similar to *Cybele wörthi,* and belongs to the same group, but it is more nearly allied to *Cybele brevicauda Ang.,* and is possibly its immediate predecessor.

Cybele mchenryi Reed, 1899.

Quart. Jour. Geol. Soc., Vol. 55, p. 757, pl. 49, fig. 7.

Head semilunar, twice as broad as long, genal angles rounded; glabella cylindrical, nearly parallel sided, slightly convex anteriorly and obtusely pointed, with three pairs of slightly oblique lateral furrows; frontal lobe large, obtusely pointed in front; occopital ring marked off by a strong neck furrow, widest in the center; fixed cheeks wide, convex, with genal angles rounded; eyes located about one-third of the width of the glabella from the dorsal furrows and opposite the second glabellar furrow; ocular ridge running from the first glabellar furrow to the eye; posterior branches of the facial suture running almost to the posterior margin of the head; anterior branches curving inward and forward to the anterior margin of the head; ornamentation consisting of scattered tubercles of various sizes, but none very small.

Length of the head 7, width 14 mm; length of the glabella 5, width 4 mm.

Described from the head only, taken near Newton Head, County Waterford, Ireland.

C. verrucosa has a different glabella, as also *C. wörthi,* but this species may prove to be the same as *C. rugosa.*

Cybele lovéni Linnarson.

Kongl. Sv. Vetensk. Handl., Bd. 8, No. 2, p. 63, pl. 1, fig. 14.

Described from an entire specimen.

Head about three times as broad as long; genal angles spined, extending beyond the third segment; marginal border prominent; glabella flattened, its sides parallel, pentagon shaped; furrows three, the rear two deep, almost rounded depressions, not extending to the dorsal grooves; front furrows oval, directed obliquely to the front; glabella ornamented with tubercles; occipital ring higher than the glabella, separated by a shallow furrow which has a deep cut in its outer ends, elevated in the center where there is a large node flanked on each side by several smaller tubercles; dorsal grooves of medium depth where the side furrows of the

glabella end towards the front, with a depression in front of this, and passing into furrows which surround the anterior end of the cheeks; fixed cheeks slightly convex, tuberculated; genal angles prolonged into spines which extend to the third and fourth thoracic segment; eyes very close to the glabella, twice as near the posterior border as the anterior edge, with a ridge running obliquely from the dorsal grooves backward to the base of the eye stalks; anterior branches of the facial suture bordering the glabella, forming almost a right angle at the eyes, and extending to the rear with a slight bend to the outer edge of the head which they cut immediately above the base of the genal angles; limb broad and prominent where it borders the sides and posterior margins, but narrow in front of the glabella; three tubercles showing in the illustration on each side of the dorsal grooves.

Thorax with twelve segments, occupying two-fifths of the whole length; axis convex, sides parallel in front for about half its length, then narrowing suddenly to a point on the pygidium; pleurae a borrelet, the greater part of each pleura consisting of an elevated moulding with a smaller border edge in front, which is separated from it by a groove, and a narrower groove behind it; the four anterior pleurae directed almost straight outward, free ends short and bent backward on the third and fourth segments; sixth pleurae very much longer than the others, their points more bent; first five thoracic segments with a row of tubercles on the axis and one or more on the inner part of the moulding of the pleurae; the other segments smooth.

Pygidium one-third the length of the body, elongated, narrowing towards the rear; axis with eighteen joints notched at the sides; axis of the tail flattened; pleurae four pairs, each divided into two parts by a groove that is ornamented by a row of pits; the two anterior pleurae with free ends, the last pair united in a caudal mucro with three terminal points.

This species occurs in *Trinucleus* Schist on Fardalaberget Sheep Mt. Valley at Hogstenaberget, etc., West Gotland. (Upper Ordovician.)

The author compares this species with *C. rugosa,* of which only the tail is known, and that imperfectly. The latter has about twenty-eight axial joints and the tail ends in four or five points.

Cybele lovéni girvanensis Reed, 1906.

Tril. Girvan Dist., Palaeont. Soc., 1906, p. 126, pl. 17, fig. 1-4.

Cybele rugosa Armstrong & Young, 1876, Cat. West Scot. Foss., p. 16.

Cybele rugosa Nicholson & Etheridge, 1878, Mon. Sil. Foss. Girvan, fasc. 1, p. 112, pl. 14, fig. 13; pl. 8, fig. 5-7.

Cybele rugosa ? 1899, Mem. Geol. Sur. Sil. Rocks Brit., Vol. 1, Scotland, pp. 672, 688.

There are a few minor points in which the Girvan specimens differ from the Swedish *Cybele lovéni* and they are sufficient to indicate a definite variety. The characters of the head shield agree exactly with those of *C. lovéni* except in the presence of a small projecting knob in front of the glabella. The glabella does not increase in width anteriorly, but is parallel-sided, the fused lateral lobes of the glabella forming a rather narrower zone on each side. The thorax agrees in all respects with that of *C lovéni.* The prolongation of the sixth pair of pleurae into long, free curved spines

extending some distance behind the tip of the pygidium is exhibited in many of the Girvan specimens.

The pygidium is narrower and the axis is rather longer, being three-fourths the length of the pygidium. It is regularly conical and tapers more slowly, the sides converging posteriorly at an angle of about twenty degrees. There are twenty-two to twenty-eight rings on the axis, interrupted along the middle line for the whole length, and it is generally devoid of tubercles; in this it differs from *C. lovéni.*

The lateral lobes are elongate and narrow, consisting of four pairs of pleurae. The first pleura is divided by a median groove into two equally strong, tuberculated ridges arising opposite the first three or four axial rings, and arching, at first slightly outward, then bending backward and slightly inward. The second pleura is smaller and lies almost parallel with the axis. It consists of a narrow anterior ridge and a slightly larger posterior tuberculated one. The third pleura is still smaller and lies almost parallel with the axis, only the posterior ridge being well developed, the anterior one being very narrow and not extending to the base of the pleurae, The fourth pleura is a very narrow, slightly tuberculated ridge lying closely pressed against the axis. The ends of the pleurae are gathered closely together behind the axis and then spread out in a fan-shaped manner to form the tip of the tail.

Brunmuck Group (Upper Bala), Thrawe, etc. (Upper Ordovician.)

Cybele bellatula balclatchiensis Reed, 1914.

Suppl., Tril. of Girvan, 1914, p. 41, pl. 7, fig. 6.

Sixth or seventh thorax segments having its pleurae much stouter, broader and longer than the preceding ones in this variety, and produced backward as long, curved spines as far as, or further than the tip of the pygidium, as in *C. lovéni girvanensis;* the pleurae of the segments behind the sixth likewise elongated into spines which decrease successively in length. (Brögger, Die Silur. Et. 2 and 3, p. 136, pl. 6, fig. 2, has shown this feature to exist in *C. lovéni.* In the American *C. winchelli,* which Slocum refers to a new genus *Cybeloides,* only the sixth pleurae are elongated and enlarged.) Other thoracic pleurae with a strong, rounded median ridge having a narrow, depressed band on the edge, as in *Cybele bellatula.*

Pygidium triangular, with a narrow ridge and a pointed, conical post-axillary piece extending from its tip to the margin, and with the same spinose posterior pleurae; axis with seventeen or eighteen narrow, incomplete rings, the median one-third smooth, with a pair of small tubercles located on each ring where it abuts on this smooth zone; lateral lobes with four pairs of pleurae, the two posterior ones rendered indistinct by a curious subreticulate ornamentation covering the surface, consisting of circular, elongated or irregularly fused pits; pleurae duplicated, being composed of two unequally developed ridges, the posterior stronger, and all ending in free, slightly recurved points on the margin, successively reaching further back along the sides of the pygidium.

The ornamentation of the lateral lobes of the pygidium sufficiently distinguish the variety from *C. bellatula.*

Balclatchie Group, Llandeilo (Middle Ordovican).

Cybele michelli Reed, 1914.

Trilobites of Girvan, 1914, p. 42, pl. 7, fig. 7.

Cephalon transversely semicircular, rather more than twice as broad as long, slightly arched forward on each side and in front of the glabella, convex, bent strongly on each side and produced back to the genal angles; cheeks swollen, much elevated, subconical, and rising steeply from the anterior margin and dorsal furrows; genal angles blunt; upper edge of the rostral shield appearing on the upper surface of the cephalon and forming a preglabellar border; glabella subclavate, expanding slightly in front of the anterior lateral furrows, convex, rounded, swollen, nearly touching the front border, and encircled in front by a rostral suture, with no distinct preglabellar band; three pairs of lateral glabellar furrows represented by short, deep, transverse pits, not connected with the dorsal furrows, set at equal distances apart and successively increasing in size posteriorly; anterior pair located rather in front of the middle of the glabella; occipital ring rounded, widest in the middle, marked off from the glabella by a furrow, strongly arched forward in the middle, with a deep pit on each side similar to, and in line with the lateral pits on the glabella.

Rostral shield with the upper edge rounded, smooth, forming a narrow preglabellar marginal border, lying between the conneeting sutures, and in front of the rostral suture, on the upper surface of the cephalon, about one-third the width of the glabella; dorsal furrows slightly diverging anteriorly, with large, rounded, deep pits situated on each side of the frontal glabellar lobe at the point where they fork, the outer, stronger branch bending out and continued into the marginal furrow of the cheek, the inner, weaker branch continued round the front end of the glabella, so that they separate the subtriangular, swollen anterior end of the fixed cheeks; surface of glabella coarsely, but sparingly tuberculated, and with a line of three equidistant, specially conspicuous tubercles at the front end just above the marginal furrow; middle tubercle the smallest, with the large tubercle on the anterior end of each fixed cheek continuing the line laterally.

Fixed cheeks much swollen, rising suddenly and steeply from the dorsal furrows, bearing three large tubercles in front of the eye and a large one at the anterior end, in the angle between the branches of the dorsal furrows; posterior wings of the fixed cheeks extended laterally, narrow from back to front, with smaller and fewer tubercles; pleuro-occipital ring narrow, rounded, not tuberculate, marked off by a deep furrow; facial sutures with posterior branch nearly parallel to the posterior margin of the cheek, cutting the outer margin a short distance in front of the genal angles; anterior branches running forward from the eye and slightly converging as far as the pits in the dorsal furrows, in front of which they curve sharply inward, bending round and uniting in front of the glabella to form the rostral suture; two short connecting sutures, directed nearly at right angles to the rostral suture, and cutting the anterior edge of the cephalon about one-third the width of the glabella apart, with the rostral shield between them.

Free cheeks large, triangular, with the inner portion swollen and steeply rising from the marginal furrow, coarsely tuberculated on the upper, anterior portion; eyes far back, opposite two lateral glabellar furrows and about a quarter the width of the cheek from the side of the gla-

bella, prominent, placed a little on the outer slope of the subconical cheeks; border of the free cheeks broad, elevated, somewhat flattened, with an inner row of 7-9 large, equidistant tubercles and a less regular outer row of more numerous, but smaller ones; anterior process embracing the outer one-third of the front of the glabella; marginal furrow rather weak.

Thorax of thirteen segments; axis convex, cylindrical, slowly tapering, with swollen, lateral lobes on each ring and deep pits in the dorsal furrows between them; pleaurae horizontal and straight as far out as the fulcrum, then bent gently downward and backward, composed of a broad, anterior, depressed band, somewhat flattened and widening toward the pleural extremity, a narrower posterior depressed band, and a broad, strongly raised, rounded, slightly diagonal median ridge; ends of the pleurae not preserved; surface of the thorax finely tuberculated with one or two large, isolated tubercles on the median ridge of each pleura.

Pygidium subquadrate, narrowing slightly posteriorly, with the pleurae of the lateral lobes ending in short, free points at the same level along the straight, posterior margin; axis about one-third the width of the pygidium, broad, subcylindrical, very slightly tapering, composed of four rings at the anterior end corresponding to the four pleurae, followed by ten to twelve rather narrower rings, all incomplete in the middle; a short, pointed piece behind the end of the axis separating the extremities of four pairs of pleurae; pleurae four on each side corresponding to the anterior axis rings, lying in nearly the same plane and successively less strongly arched outward; the four pairs nearly straight and lying closely pressed against the axis; each pleura with a diagonal furrow, less than its length, cutting off a narrow anterior band; extremities of the pleurae short, free, slightly bent outward, ending at the same level posteriorly; one or two tubercles present along each pleura.

Balclatchie Group, Ardmillan and Dow Hill, (Upper Ordovician)).

The peculiar position of the rostral suture and shield in this species as described above is also met with in *Cybele affinis* Schmidt. Apart from this one feature, the other characters of the cephalon bear a considerable mutual resemblance to *C. wörthi* and *C. kutorgae*, which are closely allied, but the Girvan form is undoubtedly distinct.

Cybele mira Billings, 1865.

Palaeozoic Foss. Canada, Vol. 1, p. 292, fig. 282.

Cryptonymus (*Atractopyge*) *mirus* Vogdes, Monog. *Zethus,* etc., p. 34.

Encrinurus mirus Narraway & Raymond, Ann. Carnegie Mus., Vol 3, p. 597.

Cybele mirus Clarke, 1894. Geol. Minnesota, p. 743, (Middle Ordovician, Trenton).

Description drawn from a detached head and tail from Table Head and Pistolet Bay, etc., Newfoundland. The pygidium only, as the head belongs to the genus *Amphion.*

Pygidium elongate, conical, convex; axis twelve to fourteen distinctly defined joints; pleurae double, consisting of four pairs of narrow pleurae; the last pair commencing about midway of the axis and extending backward parallel, or converging toward the rear margin; four principal pleurae terminating in short spines.

The tail should be compared with *C. verrucosa,* from which it differs by a less number of axial joints, but it may be a young specimen.

This species was referred to *Cybeloides* by Bassler, Bibliography of Silurian Fossils of N. America.

Cybele ovata Etheridge, 1876.

Mem. Geol. Sur. Lake Distr., 1876, p. 112.

Cybele ovata Postlethwaite & Goodchild, Geol. Assoc., Vol. 9, 1886, pp. 464-465, pl. 8, fig. 17, 19.

Body broadly ovate or obtusely tapering towards the pygidium.

Cephalon semicircular; genal angles with short spines; glabella expanding slightly towards the front, which is well rounded, with the upper, middle and lower basal furrows well developed; cheeks ornamented with lateral ridges and furrows in a line with the lobes and furrows of the glabella; eyes distinct.

Thorax with twelve segments; axis narrow and appearing to have been tuberculated; pleurae double the width of the axis, nearly flat, bent downward from the seventh segment, the ends free and bluntly pointd; anterior seven pleurae curving upward; the whole surface minutely tuberculated.

Pygidium with a narrow axis and four pairs of pleurae, the pleurae much curved downward, parallel to the axis, the lower pair meeting beneath the mucro.

This form differs essentially from the two known forms, *C. rugosa* and *C. verrucosa,* species not at present known below the Caradoc rocks.

Skiddaw Slates, Sandy Beck, three miles south of Cackermouth. (Lower Ordovician.)

Postlethwaite, pl. 8, fig. 19, published for the first time a figure of Etheridge's original *Cybele ovata.*

None of the specimens give any trace of the facial suture and Postlethwaite remarks: "So that the precise affinities of both fossils (fig. 17 and 19) have to be inferred from other less reliable data. The form of the glabella in No. 17 cannot be made out with certainty, as the fossil has been somewhat distorted; but for that consideration, there is much about the aspect of the fossil under consideration that might have suggested its affinity to *Olenus.*"

Cybeloides primus (Raymond, 1905).

Glaphurus primus Raymond, Ann. Carnegie Mus., Vol. 3, 1905, p. 262, pl. 14, fig. 7-9.

Cybele valcourensis Raymond, Ann. Carnegie Mus., p. 262.

Cybeloides primus Slocum, Field Mus. Nat. Hist., Geol., Vol. 4, 1913, p. 64.

Only the glabella and free cheeks known.

Cephalon short, broad, with wide glabella outlined by a narrow, but deep furrow; glabella moderately convex, having a central lobe which expands towards the front, and two small side lobes; this appearance is caused by three pairs of glabellar furrows, all of which are short and turn back-

ward; the second pair runs back into the third and the third pair joins the occipital furrow; surface spinose; fixed cheeks very convex; eyes small, prominent; a convex spinose border separated from the cheek by a narrow furrow; a large spine at the genal angle; surface of the cheek pitted all over except just below, and a little in front of the eye, where there is a group of small spines.

Chazy Group at Valcour, New York. (Lower Ordovician.)

Cybele panderi Schmidt, nom. nov.

Rev. 6, Ostb. Sil. Tril., 1907, p. 19.

Dr. Schmidt gave this new name to the species described as *Cybele bellatula,* Rev. 1, p. 203, pl. 13, fig. 9-13; pl. 15, fig. 1-5. He includes under it *Zethus verrucosus* Pander, pl. 4, fig. 4; pl. 5, fig. 5, and Volborth, Verh. Miner. Ges., 1847, p. 8, pl. 1, fig. 5-7, and Eichwald, Leth. Ross. p. 1417, 1860.

B/3a, B/3b, C/1a. (Middle Ordovician.)

Cybele rex (Nieszkowski, 1857).

Archiv. für Naturk. Est. Liv. und Kurl., Ser. 1, Vol. 1, p. 614, pl. 1, fig. 3.

Zethus rex Nieszkowski, 1857, l. c.

Zethus rex Schmidt, Archiv. für Naturk., etc., Vol. 2, p. 190, (ex parte).

Cryptonymus rex Eichwald, 1860, Leth. Ross. Anc. Per., p. 1419.

Cybele rex Schmidt, 1881, Mem. Acad. Imp. des Sci., Ser. 7, Vol. 30, p. 209, pl. 13, fig. 21-23; pl. 14, fig. 3, 4; pl. 15, fig. 8, 9.

Cryptonymus (Cybele) rex Vogdes, 1878, Monog. Genera *Zethus;* etc., p. 30.

Description from a head from Wesenberg, Wannamois, Russia.

Head semilunar; genal angles with short spines; glabella wide in front, narrowing towards the base, convex in the center, and having on each of its slopes, on both sides, three deep oval notches which are combined with the dorsal grooves; four pairs of smooth tubercles on the glabella, in two lines converging towards each other posteriorly; limb of the glabella with five short, equidistant spines in front, giving a crown to the glabella from which it takes its name; limb wide and thick, its surface bearing large tubercles running in irregular lines; facial suture running as is usual in this family, and having a row of small tubercles on each side of the line; cheeks striated, convex, as is the glabella; eyes situated on the anterior portion of the cheeks, elevated, pedunculatd, small and club-shaped; occipital ring wide, with four tubercles.

Pygidium with four pleaurae; axis convex, with sixteen or seventeen joints, the first three or four extending across, the others notched at the sides, (Schmidt).

Prussian, Macklenburg, Estland. C/1b, C.3. (Middle Ordovician).

Cybele revaliensis Schmidt, 1881.

Mem. Acad. Imp. Sci., Ser. 7, Vol. 30, p. 207, pl. 13, fig. 20; pl. 14, fig. 6; pl. 15, fig. 6, 7; pl. 16, fig. 40.

Zethus sp. Steinhardt, Preuss. Geschieben gefundenen Trilob., p. 53, pl. 5, fig. 8.

Head crescent shaped, 2½ times as wide as long, with broad, rounded genal angles; dorsal grooves rather shallow at first, running in a vertical direction, then curving and joining the perfectly flat marginal limb furrow; frontal groove also entirely flat with scarcely deepened ends, running at a sharp angle to the dorsal groove, and surrounding the glabella in a gentle curve which separates it from the frontal rim; glabella flatly convex, almost rectangular, about one and a half times as long as broad, having a bow shaped rim so shaped that the frontal lobe has an oval form; side lobes not well developed, therefore the lateral furrows appear as lateral depressions of the glabella and do not reach the dorsal grooves; anterior furrow strongly marked at the front, the others only slightly; a fourth depression, which terminates in the dorsal groove and continues in the neck furrow, on both sides of the neck ring, parallel to the posterior rim on each side; in front of the first side furrow, and on a line with it, a plainly marked depression in the dorsal groove (the end groove); a plainly rounded tubercle at the point where the frontal groove branches off over this groove, in the angle between the dorsal and frontal grooves, and at both ends of the frontal lobe; frontal rim also exhibiting tubercles, five in number, which, however, are only faintly indicated; surface of the glabella generally perfectly smooth, but four pairs of tubercles can be distinguished in perfectly preserved specimens.

Cheeks very broad, twice as broad as the glabella, drooping sideways; faint depressions close together on the surface, as in other species, but no tubercles, or only very faint ones on the limb; eyes very far back, a distinctive characteristic of the species, and opposite the third side lateral furrow of the glabella; facial suture extending from the first lateral furrow of the glabella, at an acute angle, towards the eye, the posterior branch running parallel to the posterior margin of the head; viewed from the front, the front rim of the head shield forming a simple bow on each side, without an excrescence as in *Cybele bellatula,* in place of which the straight frontal edge of the glabella appears with the broad snout section, which is immediately beneath it; rim with fine tubercles and notched.

Pygidium, pl. 14, fig. 6; pl. 15, fig. 7; pl. 16, fig. 40, only partially preserved in our specimens, necessitating a reconstruction out of several fragments, broadly triangular, apparently broader than long, the side sections drooping less markedly than in the foregoing species; pleurae four, segments of the axis seventeen, only four of which are complete, the others only slightly indicated in the middle, and there depressed so that two raised ridges show on the side; some fine tubercles on the flat middle, placed singly or in pairs.

Pleurae, as in the preceding species, consisting of a main and a secondary rib, only the first extending to the rim and covered with faint tubercles in a row, (pl. 16, fig. 40); pleaurae ending towards the outer edge in short, exposed points, (pl. 15, fig. 7) forming a curve drawn forward;

extending from the axis, a short projection, tending downward and notched on top, pushed between the bases of the two outside points.

Estland, C/1b. (Middle Ordovician).

Cybele sextuberculata Reed, 1899.

Quart. Jour. Geol. Soc., Vol. 55, 1899, p. 752, pl. 49, fig. 8.

Described from a slightly distorted head shield.

Glabella strongly convex and club shaped, anterior one-third, forming the frontal lobe, expanding suddenly to about double the width of the neck; three pairs of small, deep, equidistant pits indicating the sides of the narrow, neck-like part of the glabella and a pair of similar pits at the end of the faint occipital groove; front pair just behind the point where the glabella widens into the frontal line; three pairs of large, equidistant tubercles along the glabella, the anterior pair being on the frontal lobe; four or five similar, conical tubercles projecting forward along the front edge of the glabella; surface finely granulated; axial furrows wide and deep; fixed cheeks about twice as wide as the glabella at its base, strongly convex, bending downward and backward towards the genal angle; a distinct ridge running outward close to the anterior edge of the fixed cheek, from the base of the frontal lobe of the glabella to the eye; two large tubercles in front of this ridge and two similar tubercles in a line behind it, parallel with the axial furrow; another smaller one lying nearer the genal angle; surface finely granulated; neck furrow broad, though shallow, neck segment narrow, rounded and tuberculated.

Affinities:—The club-shaped glabella and short, pit-like furrows resemble *Cybele brevicauda* Angelin, but the eye ridges and sparse tubercles on the glabella, with the large, anterior marginal tubrcles, recall *Cybele coronata* Schmidt, and *C. rex* Nieszkowski.

Length of cephalon 5, width 10 mm.

Tramore Limestone Series, Newtown Grove, County Waterford, Ireland. (Bala).

Cybele rugosa (Portlock, 1843).

Rep. Londonderry, etc., p. 302, pl. 5, fig. 10, as Ogygia rugosa.

Cybele rugosa McCoy, Brit. Palaeozoic Rocks, pl. 16, fig. 8.

Cybele rugosa Salter, Appendix, Brit. Palaeoz. Rocks and Foss. p. 111, pl. 1G, fig. 8.

The author illustrates a fragment of a tail. The original description is a follows:

"The axis lobe is divided into a great number of very thin (ring-like) segments. The sides appear to be entire, though strengthened by narrow ribs with thickened ends, all inclining backward; the surface between the ribs is roughened with irregular dots, giving the whole a rugose appearance."

Salter, 1. c. gives the following description of *Cybele rugosa* Portl.:

"Caudal shield long, triangular; axis equal to the deflected side lobes, with about twenty-eight rings, effaced down the middle, which is occupied by a broad, smooth band; in the upper three-fourths these rings at inter-

vals become stronger and more prominent, but there are no tubercles down the center line; side lobes more prominent at first than the axis, but towards the end of the tail strongly bent down; lateral ribs five, directed longitudinally, each with three or four tubercles; an intermediate rib and rugose surface between the upper ones; the last two or three from each side uniting beyond the axis in a 4-5 spined point, etc. Coniston Limestone."

The species referred to *Cybele rugosa* (Portl.) by Nicholson & Etheridge, Monog. Sil. Foss. Girvan Dist., p. 112, pl. 14, f. 13; pl. 8, fig. 5-7, has been referred by Reed to *C. lovéni.*

Lower Portion Ordovician Schist, Deserterat, Tyrone, Ireland. Lower Llandovery. (Upper Ordovician).

Cybele spicata Raymond, 1921.

Geol. Sur. Canada, Mus. Bull. No. 31, 1921.

Known only so far from an imperfect cranidium.

Glabella moderately convex, outline concave at the sides, expanded in front; sides indented by three pairs of short, but deep glabellar furrows, which have the form of transverse pits connected by shallow depressions with the dorsal furrow, with their ends running as shallow furrows into the more convex median portion of the glabella; a narrow furrow at the anterior margin of the glabella in front of which rise five large spines; a row of pairs of sharply conical pustules along the top of the glabella; fixed cheeks wide and not extending far forward; eyes located on a small mound and rather far back for the genus; genal angles rounded ? perhaps spinous.

The species is exceedingly like *Cybele coronata,* with its five short spines on the frontal margin.

Collingwood Limestone, Craigleith, Ontario. (Ordovician.)

Cybele tramorensis Reed, 1895.

Geol. Mag., Vol. 2, p. 48, pl. 7, fig. 1.

Cybele tramorensis Reed, 1899, Quart. Jour. Geol. Soc., Vol. 55, p. 750, pl. 4.

Description from a spatulate-fronted head.

Head semicircular, twice as long as wide; glabella oblong, slightly elevated above the cheeks; side furrows three, the anterior furrow merely an elongated deep pit, therefor the frontal lobe is marked off by this pair of isolated pits; middle side furrow obliquely set at an angle of about seventy degrees; third furrow parallel to, and as deep as the second at its inner end, but it does not decrease in depth to the same extent in its outer portion; dorsal grooves shallow, in front of the first lobe practically nonexistent, as the ocular ridge and terminal pit lie across their forward course; anterior end of the glabella steep and abruptly truncated, separated from the peculiar anterior margin by a faint depression; middle portion of the anterior margin projecting one-third the length of the glabella as a median, flat, spatulate process, transversed by five flattened ridges separated by faint grooves, fan shaped; a rounded ridge slightly in front of the

anterior, outer angles of the frontal lobe of the glabella running forward and slightly outward to become a prominent tubercle projecting beyond the margin, corresponding to the side tubercles of *Cybele coronata* Schmidt; a deep circular pit in the anterior end of the dorsal groove close beneath the posterior outer slope of the ridge leading up to the side tubercles; an ocular ridge running outward to the eyes at right angles to the axis of the glabella, and opposite the first side furrow, having a row of minute pits close to the base at each side and bearing two large tubercles.

Eyes small, nearly equal to the width of the frontal lobe of the glabella; principal portion of the cheek lying behind the ocular ridge; genal angles bluntly pointed; surface with a few (2-3) large tubercles.

The specimen described in the Geological Magazine was from an imperfect head shield; another specimen from the Dublin Museum described in the second paper shows that the posterior outer portion of the fixed cheek is much produced laterally, and the posterior border of the cheek curves steadily backward to the genal angle, which is bent downward and produced into a rounded spine.

The eye ridge runs at a right angle to the axial furrow, from the level of the anterior glabellar furrow to the base of the long, stalk-like eye lobe, which is located at a distance from the axial furrow about equal to the width of the glabella, and directed forward, outward and upward. There are three large tubercles on the fixed cheek.

Bala Group, County Waterford, Ireland. (Upper Ordovician).

Cybele verrucosa (Dalman, 1826).

Head of a Trilobite, Brongniart, 1822, Hist. Nat. Crust. Foss., p. 145, pl. 4, fig. 11.

Trilobites velatus Schlotheim, 1823, Nachtr. Petrifac. 11, p. 40, pl. 22, fig. 5.

Calymene? verrucosa Dalman, 1826, K. Svensk. Vet. Akad. Handl., p. 285.

Calymene verrucosa Dalman, 1828, Palaed., p. 76.

" " Dalman, 1828, Vet. Akad. Arsb., p. 134, note 2.

" " Férussac, 1829, Bull. Sci. Nat., Vol. 19, p. 128.

Calymene bellatula Eichwald, 1840, Sil. Schicht, Estl., p. 66.

Cybele verrucosa Lovén, 1845, Ofv. K. Svensk. Akad. Forhandl., No. 4, p. 111, pl. 1, fig. 5a-f.

Trilobites (Calymene) verrucosus Lovén, 1845, l. c. No. 3, p. 52.

Cybele verrucosa Corda, 1847, Prodrom., p. 205, pl. 5, fig. 52a-d.

" " Salter, 1848, Mem. Geol. Surv. Great Brit., Vol 2, p. 343.

Cybele sexcostata Salter, 1848, Mem. Geol. Sur., Vol. 2, p. 343, pl. 8, fig. 9 only.

Cryptonymus verrucosus Angelin, 1852, Pal. Scand., p. 4, pl. 5, fig. 1.

Zethus atractopyge McCoy, 1855, Brit. Pal. Foss., p. 156, pl. 1G, fig. 1-5.

Cybele verrucosa Hoffmann, 1857-8, Verhandl. Russ Min. Ges., p. 32, pl. 3, fig. 3a-c. Copy of Volbroth's figure which Schmidt referred to *C. panderi.*

" " Hoffman, 1858, l. c. fig. 4, referred to *C. bellatula.*

" " Salter & Woodward, 1865, Chart. Foss. Crust., p. 12, fig. 48.

" " Linnarsson, 1866, Om. Sil. Bild. Mellersta Westgöthland, 1866, p. 18.

" " Salter, 1867, in Murchison's Siluria, 4th Ed., p. 206, Foss. 48, fig. 2.

" " Salter, 1873, Cat. Camb. Sil. Foss., p. 51, fig. Entire with twelve thorax segments.

" " Nicholson & Etheridge, 1878, Mon. Sil. Foss. Girvan Distr., p. 111.

Cryptonymus (*Atractopyge*) *verrucosus* Vogdes, 1878, Monog. Gen. Zethus, Cybele, etc., p. 32, pl. 4.

Cybele verrucosa La Touche, 1884, Hanb. Shropshire, pl. 3, fig. 60.

" " Reed, 1906, Tril. Girvan Distr., Palaeont. Soc. p. 129.

The species would be difficult to recognize were it not for Lovén's accurate figures, which he took from a North Wales specimen. They are copied by Corda. The type of Dalman's species was the specimen figured by Brongniart from a drawing by Mr. Stokes of a Llandeilo specimen.

Species very large with the head more than three inches wide; eyes small and pedicled, located almost half way between the glabella and the anterior lateral margin; and nearly opposite the frontal furrow; genal angles obtusely spined; limb broad, with between the glabella and the sutures commencing on the outer margin of the head, just above the genal angles, running in a straight line to the eyes, thence to the anterior margin over the limb to the rostral shield; glabella clavate, marked by three lateral furrows, the frontal lobe broad; surface ornamented with tubercles.

Thorax with twelve segments, all the pleurae of equal length, and terminating in spines; ornamented with a central row of tubercles; axis with four tubercles on each ring.

Pygidium rectangular, ornamented with two lateral rows of tubercles; axial rings twenty, the first four extending across, the others notched at the sides; pleaurae four, with a central row of large tubercles, of equal length and extending just beyond the axial point.

Cybele verrucosa is a common fossil of the Ordovician of England and Sweden.

Ruedemann, Bull. N. Y. State Mus., No. 49, p. 67, makes *Zethus atractopyge* McCoy, *sexcostatus* and *rugosus* synonyms of *Cybele verrucosa.*

McCoy, British Palaeozoic Fossils, p. 157, remarks: "In placing *Zethus atractopyge,* which is the *Cybele verrucosa* of Lovén, in the genus Zethus, I have been obliged to propose a new specific name for it, as it is not the *Zethus verrucosus* of Pander, and as I cannot agree with Volborth in referring it to the *Zethus bellatula* of Dalman."

On p. 156, in describing the genus *Zethus,* McCoy remarks: "I follow Dr. Volborth in referring *Cybele* of Lovén to *Zethus* of Pander, and, after a most careful consideration of the different species, I find so imperceptible a gradation in the structure of the pygidium from *Atractopyge,* in which the four upper anal segments are prolonged into the side lobes and deflected close along the axis (believing with Lovén that those are really pygidial segments), to those in which two or three more lateral ribs are added, that I also feel satsified that *Atractopyge* of Hawle and Corda should be added to Zethus."

For this reason McCoy used the generic name of those authors to designate the species (*Zethus atractopyge* Corda).

Range: Westergotland, Div. 4, *Trinucleus* Shale; North Wales, Bala; Girvan District, Llandeilo.

Salter, Mem. Geol. Sur. United Kingdom, Decade 7, pl. 4, p. 4, remarks: "We first described *Cybelle sexcostata* in 1848 in the work above referred to, under the same name. In those figures there was associated with the tail, but only provisionally, a coarsely tuberculated head, (pl. 8, fig. 9,) which occurred so frequently in company with it, that the two might reasonably be supposed to belong to each other. The figure we now give justifies the caution there expressed, for it is the more clavate form of head, rarely occurring, which probably belongs to the species, the head figured in company with it, we are now all but certain, being that of *C.* (*Calymene*) *verrucosa* Dalman."

Cybele winchelli Clarke, 1894.

Geology of Minnesota, Vol. 3, p. 742, figure in text.

Described from an entire specimen with defaced head from the Galena Limestone of Fillmore County, Minnesota.

Head transverse, broadly rounded at the sides, somewhat concave on the frontal margin, which is slightly elevated.

Length 10, width 26 mm.

Genal angles spined, limb prominent.

Thorax subquadrate, tapering, with 12 segments; axis narrow, convex, one-fourth the width of the thorax; segments slender, distinctly grooved for their entire length, or to within a short distance of their ends; first five obtusely rounded at their ends, the last seven acute; the sixth greatly expanded at the line of geniculation, and each extremity is produced as a stout spine considerably beyond the end of the tail; the last six segments are like the first five in that they curve more abruptly backward with spinose terminations.

Pygidium short, narrowing in from the articulating ring of the axis very markedly to its pointed termination; axis with one entire joint and eight or nine notched at the sides; the acute end of the axis not reaching the end of the tail; pleurae four or five; the second, third, fourth and fifth pleurae ending in acute, free points which are directed outward.

Surface finely tuberculated; free cheeks slightly punctate or pitted.

Referred by Slocum to the new genus *Cybeloides.*

Middle Ordovician.

Cybele wörthi (Eichwald, 1840).

Schichtensystem von Estland, 1840.

Cryptonymus wörthi Eichwald, 1840, Sil. Syst. Estl., p. 70.

Cryptonymus wörthi Eichwald, Leth. Ross., p. 1416, pl. 54, fig. 7, Bala.

Zethus bellatula Volbor. Verh. Min. Ges. Jahrg., 1848, p. 10, pl. 1, fig. 1-4.

Cybele wörthi Schmidt, Mem. Acad. Imp. Sci., Vol. 30, p. 214, pl. 13, fig. 14-17.

Cybele wörthi Vogdes, 1878, Monog. Gen. *Zethus, Cybele,* etc., p. 33.

Cybele cf. *wörthi* Wigan, 1888, Zeitschr. d. Deutsch. Geol. Ges., p. 90, pl. 10, fig. 18.

A very slender species, not longer than one and a half inches.

The difference between *Cybele wörthi* and *C. bellatula* consists in the termination of the facial suture and the location of the eye knobs. These latter are placed more to the front in *C. bellatula,* and opposite the first side lobe of the glabella in *C. wörthi,* the glabella being flat, with faint side furrows. In *C. wörthi* the facial suture terminates nearly parallel with the posterior margin of the head, as the eye knobs are placed nearer to this than to the anterior margin. In *C. bellatula* the eyes are located more to the front on both sides of the frontal lobe of the glabella, therefore the facial sutures run in an oblique line to the front from the genal angles. The lateral furrows of the glabella are distinct in *C. bellatula,* but in *C. wörthi* indistinct, the eyes being placed opposite the middle glabellar furrow.

The thorax has twelve segments.

The pygidium is oval, with sixteen axial joints extending across the axis, which ends in a point. There are four pleurae, the last pair enclosing the end of the axis. The center of each pleura is marked with a tubercle.

Pawlowsk, Russia, etc., B/3b. C/1a.

Petersburg & Estland; Mecklenburg. (Middle Ordovician.)

Cybeloides Slocum, 1913.

Field Mus. Nat. Hist., Geol. Series, Vol. 4, No. 3, 1913.

This new genus was suggested by Arthur W. Slocum, Geological Series, Vol. 4, No. 3, 1913, p. 63, Field Museum of Natral Histoury, Publication 171; also Geol. Surv. Iowa, Vol. 25, 1914, p. 212, pl. 17, fig. 1-4, together with *Cybeloides iowensis* sp. nov.

Generic description:

Body distinctly trilobate in outline aside from the spines, subovate.

Cephalon sublunate; genal angles produced into spines, in which the genus differs from Lovén's genus *Cybele* as exhibited in *C. bellatula,* as also in the form of the glabellar furrows; glabella divided by two longitudinal furrows into a central and two lateral lobes; lateral glabellar furrows indicated by three pits situated in each longitudinal furrow; eyes small, pedunculate; facial sutures originating on the lateral margins, somewhat in front of the genal angles.

Thorax with twelve segments, the anterior five faceted at their distal extremities; the sixth segment abruptly bent backward at the lateral margin of the thorax and produced into a long spine, and this is true in some cases of all segments from the sixth to the twelfth.

Pygidium small; axis conical, with many joints; pleurae with few ribs.

Range in North America, Ordovician.

The author referred to the genus *Cybeloides* the following species: *Cybele ella* Nicholson & Raymond, *Glaphurus primus* Raymond, the synonym *Cybele valcourensis* Raymond, *Cybele winchelli* Clarke, *Cybele* sp. Ruedemann, 1901, and a new species *Cybeloides iowensis*.

Slocum remarks that the three European species, *C. grewingki*, *C. Kutorgae* and *C. revaliensis* exhibit a tendency towards the American forms.

Cybeloides iowensis Slocum, 1913.

Body depressed, convex, distinctly trilobed in outline aside from the spines, subovate, tapering rather rapidly to a small pygidum; surface finely granular, with many more or less prominent, rounded nodes.

Cephalon short, the width nearly three times the lengeth, outline sublunate, with the anterior lateral margins inflated; glabella convex, inflated anteriorly, somewhat longer than wide; median lobe clavate, narrow at the occipital furrow, gradually widening for about half its length, then abruptly widening to its greatest width, rounded in front; lateral lobes longitudinally oval; longitudinal glabellar furrows originating in deep pits on the occipital furrow, converging slightly, then curving forward and outward; position of the lateral furrows indicated by three pits in the longitudinal furrows; occipital ring prominent and more elevated than any other part of the caphalon, wide between the glabellar furrows, abruptly narrowing towards the dorsal furrows, bearing a median node with a smaller one on each side of it; occipital furrow shallow and ill-defined in the median portion, deepened into pits in the dorsal furrows.

Ornamentation of the glabella finely granular, with many rounded tubercles arranged in more or less uniform transverse rows; the largest two nodes close together near the anterior margin and pointing forward; a well marked circular pit on the median line of the glabella just in front of a line connecting the anterior pair of glabellar pits.

Cheeks large, depressed, convex, not rising as high as the glabella; genal angles produced into long spines which extend backward more than half the length of the thorax; marginal borders convex, posterior marginal furrows narrow and deep; lateral marginal furrows not well defined.

Posterior end of the facial suture originating on the lateral margin, just in front of the genal angles, passing almost straight to the palpebral lobes, after crossing which, the anterior portion extends forward for a short distance, then curves tbruptly towards the median line and again forward to the anterior margin.

Eyes small, pedunculate, situated on a line with the anterior pair of glabellar pits near the dorsal furrows; a pair of ocular fillets connecting the eyes with the anterior lobe of the glabella; cheeks inside the marginal border reticulated or covered with a row of pits; surface of the marginal borders granular like the glabella; many tubercles irregularly distributed over the cheeks, these nodes averaging sometimes larger than those on the

glabella, the larger ones being on the posterior margin and pointing backward.

Thorax with twelve segments, rather rapidly tapering posteriorly, distinctly trilobed; axis convex, less than one-third the width of the thorax; pleurae curving gently for about one-half their length, then more rapidly to the lateral margin; each pleura divided unequally by a furrow extending nearly from the dorsal furrows to the ends; posterior portion wide and bearing numerous tubercles; axis with four tubercles and each pleura with two or more which are much larger than those on the axis; five anterior segments of the thorax short, the seven posterior segments abruptly bent backward and produced into spines, the spines of the six segments extending more than one-third their length beyond the pygidium, the spines of the other segments being considerably shorter.

Pygidium small; length along the axis 23.6 mm.

Lower Maquoketa Beds at Elgin, Iowa.

Inasmuch as such Palaeontologists as Lovén, Salter, Nieszkowski, Schmidt, Linnarsson, Törnquist, Clarke and Reed have placed under *Cybele* species with the genal angles extended into spines and the lateral furrows of the glabella with pits or depressions near the dorsal furrows, features indicated in the new genus *Cybeloides*, I cannot see any valid reason for retaining the genus.

Doubtful Forms Which Have Been Referred To Other Species.

Zethus verrucosus Pander, 1830.

Beiträge zur Geognosis des Russischen Reiches, 1830, p. 140, pl. 5. fig. 6; pl. 4C, fig. 4.

Cybele bellatula Schmidt, 1881, Rev. 2, Ostb. Sil. Tril., p. 203.

Zethus verrucosus Volborth, 1847, Verhandl. Min. Ges. Jahr., p. 8, pl. fig. 5-7.

Zethus verrucosus Pander, Eichwald, Ueber die Gattungen *Cryptonymus* und *Zethus*, 1855, p. 13.

Zethus verrucosus Portlock, 1843, Rep. Geol. Londonderry, p. 287.

Pander gives the following description of this species:

Zethus verrucosus, pl. 5, fig. 5; pl. 4C, fig. 4.

Unfortunately we possess only a fragment of this species and it is very probable that it belongs to *Entomostracus punctatus* Wahlenberg, (*Calymene punctatus* Dalman) but we observe from the few, though disturbed and fractured thoracic parts that still adhere to our fragment, that the sections, as well as the cephalon, are covered with small, raised tubercles lying in one row, whereas those of *Calymene* punctata appear entirely smooth. The cephalon, as we see, is divided by the prolongation of the dorsal furrows (back furrows), which run nearly parallel to the outer margin. There are transverse folds (lobes) on the glabella (middle head), as well as on Amphion frontiloba, but there is no trace of eye knobs. The surface of the cephalon is covered with tubercles. The side sections of the trunk are split by a fold, as in *Calymene*... *We* possess no pygidium and therefore are unable to determine definitely whether this species really belongs to the genus *Zethus*.

Dr. Schmidt, Rev. 6, Ostb. Sil. Tril., 1907, p. 19, describes *Cybele panderi* sp. nov., and includes *Cryptonymus parallelus* Eichwald, a species which Volborth also placed under *Zethus verrucosus*.

Dr. Eichwald, 1855, p. 13, remarks on this statement of Volborth, "Dr. Volborth had no right to take *Cryptonymus parallelus* for *Zethus verrucosus* Pander, and attribute eyes and eye knobs and also a facial suture to the latter, notwithstanding that, in his work on the genus, Dr. Pander describes Zethus without eye knobs and its cheeks without furrows."

Cryptonymus parallelus Eichwald, 1840.

Schichtensystem von Estland, 1840, p. 73.

Zethus verrucosus Pander, Volborth, Verhandl. der Min. Ges., 1848, p. 8, pl. 1, fig. 5-7.

Cryptonymus parallelus Eichwald, Uber die Gattungen *Cryptonymus* und *Zethus*, 1855, p. 13.

Cryptonymus parallelus Eichwald, Lethaea Rossica, 1860, p. 1417.

Cephalon semicircular, large and flat; anterior lobe of the glabella not broader than long, provided on each side with three complete oblique furrows; anterior border of the head prolonged into a pointed projection with an additional point on each side; facial suture commencing at the genal angle, passing to the eye knob, which is situated almost on the anterior border of the head, then diverging parallel to the lateral border of its sides.

Thorax with the pleura of the sixth segment prolonged into a long point.

Pygidium ornamented with five pairs of pleurae running parallel to each other and almost of equal length.

Orthoceralites de Poulkowa and rare at Erras.

Schmidt, Rev. 1, 1881, united *C. parallelus* to *C. bellatula;* in Rev. 6, 1907, he made a new species for Volborth's figures 1-7, pl. 1, *Cybele panderi*, and included Eichwald's species.

Trilobites velatus Schlotheim, 1823.

Nachtr. 111, 1823, pp. 40 and 86, pl. 22, fig. 5, pygidium.

Asaphus velatus Holl, Petref, p. 175.

Trilobites velatus Dalman, Palaead., p. 288, German Ed. p. 76.

Trilobites velatus Lovén, K. Sv. Vetensk. Akad., 1845, p. 11.

Zethus verrucosus Pander, Volborth, Verhandl. Min. Ges., 1848, p. 8.

The species was referred to *Cybele panderi* Schmidt, 1907, p. 19.

Cybele valcourensis Raymond, 1905.

Ann. Carnegie Mus., Vol. 3, No. 2, p. 362, pl. 14, fig. 4.

Pygidium narrow, tapering almost to a point; axis narrow but distinct, not extending to the posterior end; axial rings sixteen to eighteen, only the first complete, the others showing only on the sides; four to five pairs of nodes located along the top of the axis at equal intervals along its length; a single median protuberance at the posterior end of the axis; four pairs of duplicated pleurae on the lateral lobes bending backward

almost parallel with the axis, each pleura consisting of a smaller anterior and larger posterior portion; pleurae ending in short, rounded spines which extend a very short distance behind the border, and if broken, giving the appearance of an entire margin; a small node on each rib near the axis.

The species was referred by Slocum to *Cybeloides* as a synonym of *C. primus*.

Cybele sp. Ruedemann, 1901.

Bull. N. Y. State Mus., No. 49, p. 66, pl. 4, fig. 12.

Pygidium axis long, conical, its annulations indicated only along the margin in the anterior part, suppressed in the middle part where the ornamentation consist of two pairs of tubercles, and extending entirely across the axis posteriorly; pleurae five pairs which leave the axis nearly at a right angle, but gradually become deflected to a direction parallel with the axis; a few tubercles on these pleurae.

Gray limestone pebbles of Rysedorph Hill Group.

This pygidium differs from *C. winchelli* in not having the pleurae deflected abruptly and in the tuberculation and the character of the annulations on the axis. Differs from *Cybele mira* in its tapering axis.

Both these Trenton forms, especially the latter, may prove to be identical with Reudemann's species.

A specimen belonging to the writer differs in no essential features from the pygidia figured by McCoy as *Zethus atractopyge, sexcostatus* and *rugosus*, which names are synonyms of *Cybele verrucosa*.

EXPLANATION OF PLATES.

Plate I.

Fig. 1. Cybele bellatula.

" 2. Cybele revaliensis, (after Schmidt, Rev. 1, pl. XIII, fig. 20a.)

" 3. Cybele coronata, (after Schmidt, 1. c., pl. XIII, fig. 24 a.)

" 4. Cybele mchenryi, (after Reed, Quart. Jour. Geo. Soc., 1899, pl. XLIX, fig. 7.)

" 5. Cybele tramorensis, (after Reed, 1. c., pl. XLIX, fig. 6.)

" 5a. Cybele tramorensis, (after Reed, Geol. Mag., 1895, pl. III, fig. 1.)

" 6. Cybele sextuberculata, (after Reed, Quart. Jour. Geo. Soc., 1899, pl. XLIX, fig. 8.)

" 7. Cybele bellatula, (after Volborth, Verhandl. Russ. K. Min. Ges., 1847, pl. 1, fig. 5.)

" 8. Cybele aspera, (after Linnarsson, K. Vet. Akad. Handlingar, VIII, pl. 1, fig. 11.)

" 9. Cybele vigilans, (after Hall, Pal. N. Y., Vol. 1, 1847, pl. LXV, figs. 2a, b, c, e, f, g, h.)

" 10. Cybele aspera, (after Linnarsson, 1. c., pl. 1, fig. 12.)

" 11. Cybele aspera, (after Linnarsson, 1. c., pl. 1, fig. 13.)

" 12. Cybele grewingki, (after Schmidt, 1, c., pl. XIV, fig. 1 b.)

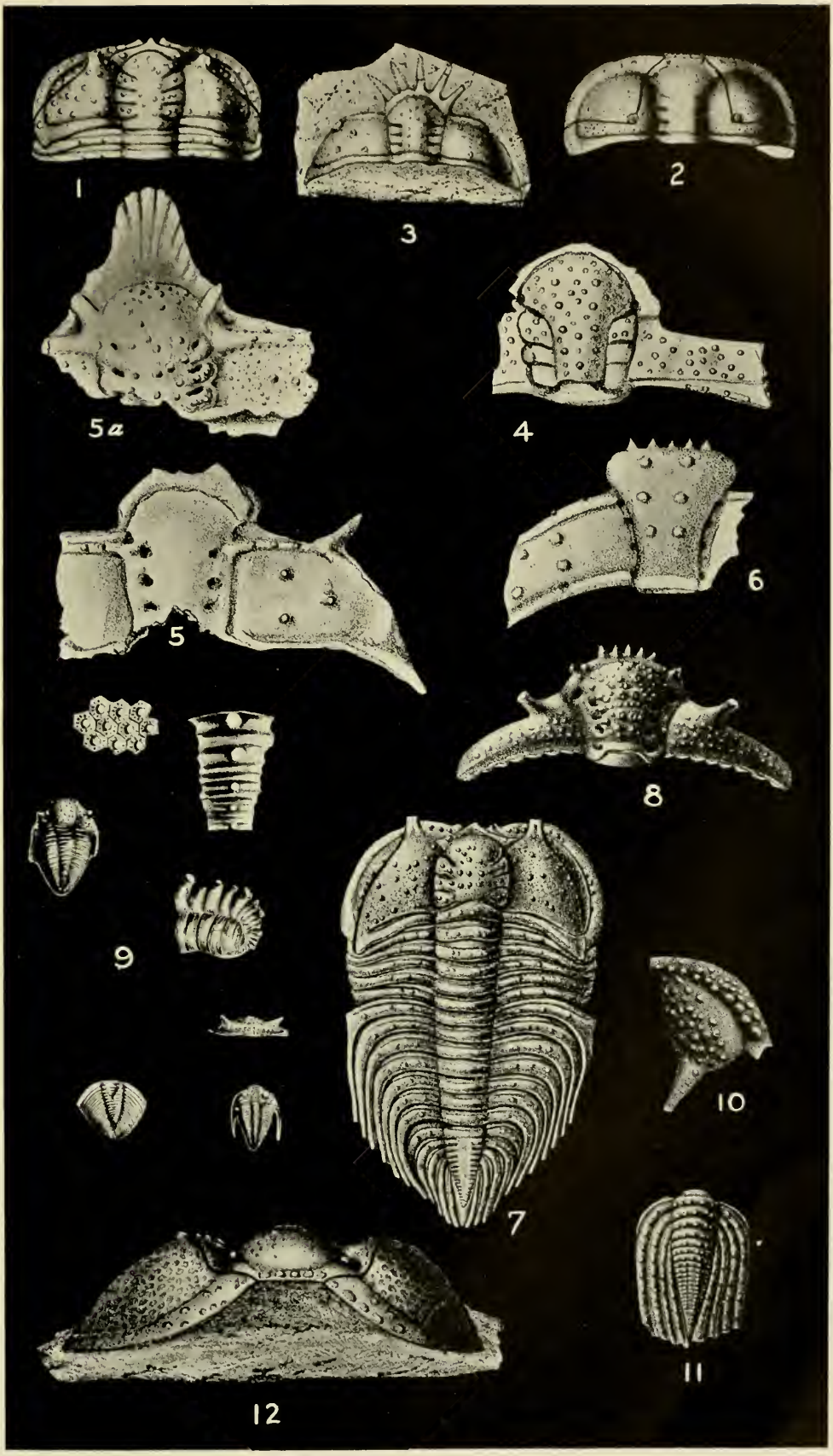
Plate II.

Fig. 1. Cybele verrucosa, (after Angelin, Pal. Scand., pl. V.)

" 2. Cybele bellatula, hypostoma, (after Lindström, Visual Org. Tril., pl. 4, fig. 2.)

" 3. Cybele lovéni, (after Linnarsson, K. Vet. Akad. Handlingar, VIII, pl. 1, fig. 14.)

" 4. Cybele verrucosa.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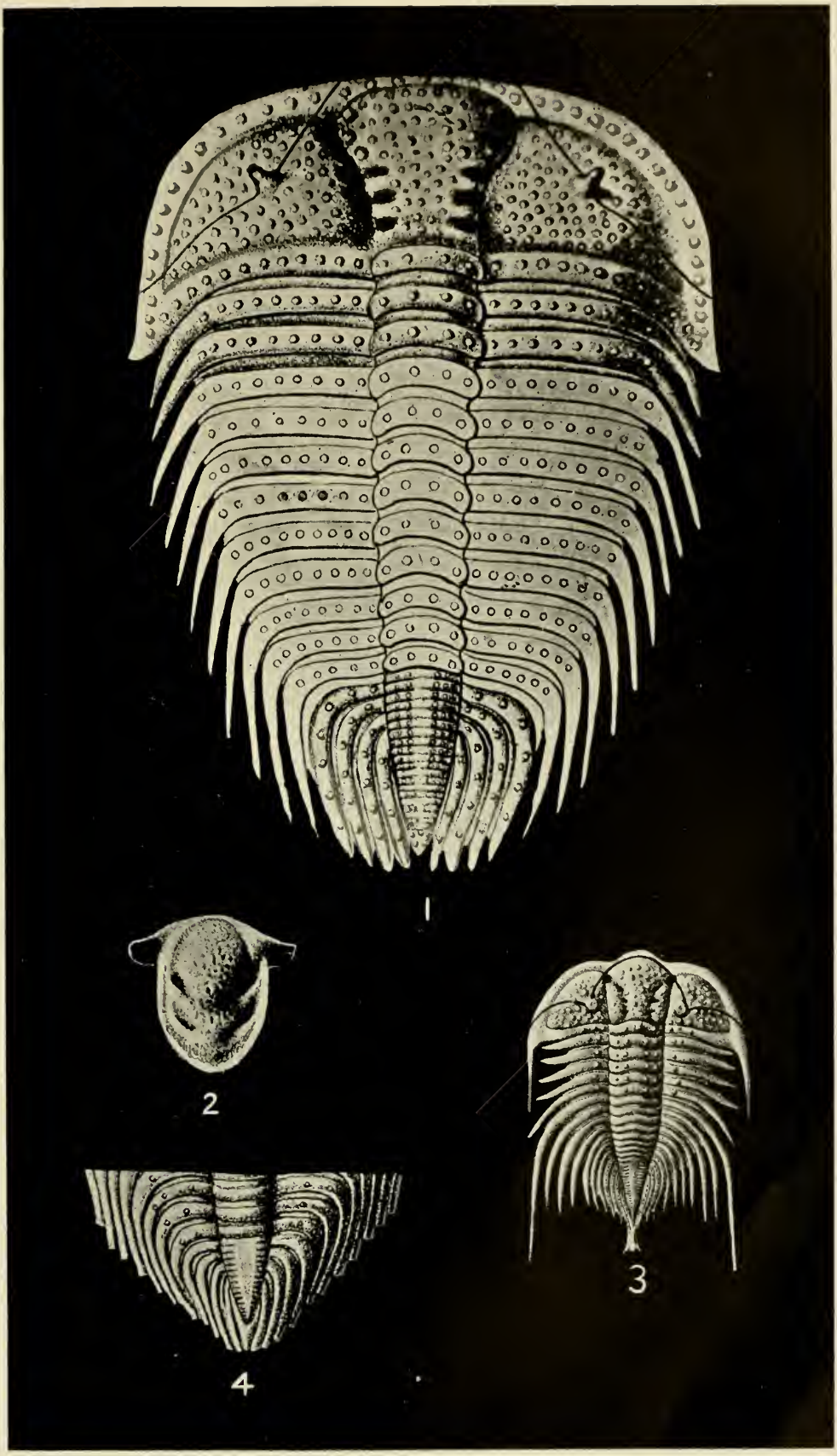
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